Abstract

CHARACTERIZING THE DECEASED MARINERS OF THE SWEDISH WARSHIP *VASA*: AN ANALYSIS OF PERSONAL POSSESSIONS FOUND IN ASSOCIATION WITH HUMAN REMAINS

by

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April 2014

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On August 10, 1628, as onlookers watched in dismay, the newest and most powerful warship in Northern Europe, a symbol of the prestige and power of Sweden and Sweden's King Gustav II Adolf, heeled over and sank in Stockholm Harbor. At least 30 people lost their lives as *Vasa*, sails set, descended to the harbor bottom. Intact shipwrecks, such as *Vasa*, and their associated artifacts prove valuable in revealing the character of historic seamen. They actively reflect this once familiar lifestyle, allowing archaeologists to determine not only the ship's culture but also aspects of its former parent culture.

This study seeks to understand shipboard life via an examination of thirteen sailors, two female passengers, and their personal possessions. The primary goals are to identify the distinctive features of a typical sailor on board the *Vasa* and to determine those features' historical significance. This research considers the history, material, construction, design, and function of 277 artifacts associated with *Vasa*'s human remains. The examination includes the identification, cultural analysis, evaluation, and interpretation of these artifacts.

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A Thesis Presented To the Faculty of
the Department of History, East Carolina University

In Partial Fulfillment of the
Requirements for the Degree Master of Arts

by

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April 2014

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This thesis is dedicated to the memory of
my grandmother, Betty Lou Hamby,
who encouraged me in all of my endeavors
and loved me more than the universe.

ACKNOWLEDGEMENTS

Over the past few years, I have learned that it is impossible to complete an archaeological research project without the collaboration of scores of people. Therefore, numerous individuals deserve my utmost gratitude. First and foremost, I wish to thank my loving parents, whose patience and support have allowed me to reach so many of my life's goals. A great deal of gratitude goes out to my thesis advisor and committee members: Dr. David Stewart, who patiently read and directed my research, Dr. Wade Dudley, who has helped me develop my writing skills on so many levels, Dr. Larry Babits, whose expertise on historic clothing proved invaluable, Dr. Fred Hocker, who provided open access to the *Vasa* collection and indispensable knowledge about the wreck and excavation, and Dr. Lynn Harris, who stepped up when I really needed a replacement committee member.

I would also like to thank the *Vasa* Museum (Vasamuseet) and its entire staff, especially Fred Hocker, Emma Hocker, and David Feldt, for all their support. Special thanks to Lars Einarsson, Max Jahrehorn, and Evelina Sand of the Kalmar Läns Museum for important insights into the *Kronan* collection and Simon Ware of the *Mary Rose* Trust for a behind the scenes tour of the *Mary Rose* collection. In addition, I would like to thank Ninya Mikhaila of the Tudor Tailors for her assistance in understanding the design and construction of early clothing.

I would like to extend my appreciation to all of my contacts at the various museums in Sweden, including the librarians at Nordiska Museet, Sjöhistoriska Museet, and Stockholms Stadsmuseum, Karin Tetteris of the Armémuseum Stockholm, Inger Olovsson and Monica Sagren of Skoklosters Slott, Fredrick Andersson of the Livrustkammaren, and Anna-Lena Nilsson of Sjöfartsmuseet Akvariet in Göteborg. Without these people, my project would lack figures.

I would like to thank my fellow *Vasa* researchers (Trevor Draeseke, John Ratcliffe, Nat Howe, Eric Ray, and Stephanie Gandulla), who provided unique insights into the *Vasa* materials and helped me to know I was never alone in my quest to understand Swedish. Finally, I would like to thank all of my friends, in and out of the Program of Maritime Studies, who provided encouragement along the way and put up with my complaints and anxiety near the end.

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CHAPTER 1: INTRODUCTION

“In the empty immense of earth, sky,
and water, there she was incomprehensible,
firing into a continent” (Conrad 1950:78).

A good deal of research has been conducted in reference to shipboard life. Historians have often considered the daily diaries, journals, and correspondence of the individuals who partook of this lifestyle. Meanwhile, maritime archaeologists have considered personal chests of seamen, officers’ cabins, galleys of ships, and personal materials scattered across wrecks, but few have considered personal property found with skeletal remains. The reason for this lack of investigation is the preservation of materials. The seventeenth-century Swedish warship *Vasa* is an exceptional find. A majority of the individuals are still close to their original location of death and personal belongings are in their context of use. Researchers have the rare opportunity to interpret the material culture as it was 385 years ago and to characterize seventeenth-century Swedish sailors. Deeper analysis will reveal information concerning the ship’s closed society and that society’s relationship to both Swedish culture and broader European culture. More specifically, this study seeks to understand shipboard life via an examination of thirteen sailors and two female passengers and their personal possessions.

RESEARCH QUESTIONS

The goal of this study is to analyze and compare *Vasa*’s deceased individuals’ artifacts in an effort to characterize the theoretical owners. Information gained from the study will be employed in answering seven primary questions: 1) What did the typical *Vasa* mariner wear and have on his person on a regular basis aboard the ship? 2) Why might he have had these materials? 3) How would he have obtained the artifacts—government issued or personal? 4)

Did a sailor require certain objects to be nearby, which the average citizen did not even own? 5) Is a social hierarchy revealed by the seafarers' attire and belongings? 6) Are the sailors' appearances reflective of 1628 society or do they maintain their own style of dress, their own 'maritime culture'? 7) How does the *Vasa* 'maritime culture,' or lack there of, relate to other nations, such as Spain and England?

Answering these questions will begin to fill in a large gap within the history of shipboard life. A great deal of information is known about ship communities of the nineteenth century via historical documents but little is known about earlier centuries. It is unlikely that ship communities failed to evolve over time. Projects like this one provide a glimpse into earlier shipboard life, allowing archaeologists to identify this evolution. This study takes the first steps towards unraveling the various behaviors and identities of Swedish seamen. It not only assists in the understanding of seventeenth-century Swedish naval culture but also the overall culture of seventeenth-century Sweden. In doing so, it can be used as a model for future analysis of personal possessions found in association with skeletal remains on shipwrecks.

ORGANIZATION

This thesis consists of seven chapters, the first of which is the Introduction. Chapter two places the *Vasa* within a larger framework of Swedish history, particularly Swedish naval history. It considers the social, political, and economic circumstances of seventeenth-century Sweden, noting the revolutionary changes instigated by Gustav II Adolf. This includes his major reforms of the Swedish fleet, issuance of new conscription orders, and establishment of a permanent officer corps. These circumstances ultimately led to both the creation and loss of *Vasa*.

Along with placing *Vasa* into a historical context, chapter two considers the archaeological context of *Vasa* and its associated artifacts. The chapter outlines the conditions of the ship's construction, the reasons for its loss, the site formation process, and the methods of recovery and excavation. It thus explains why a study of the relationships between *Vasa*'s skeletal remains and nearby artifacts can be undertaken.

Chapter three presents the theoretical foundation of this thesis and details the methodology derived from it. Summarizing material culture theory, it defines material culture, outlines the history of material culture studies, describes how artifacts embody social relations, and considers the predominant problems with material culture studies. On a more practical level, this chapter discusses nine case studies that apply material culture theory in an effort to understand shipboard life from sailors' clothing and/or personal possessions. The derived methodology of this thesis, which is largely based on E. M. Fleming's (1999:165-166) proposed model of artifact study, considers the history, material, construction, and design of each artifact and requires their identification, cultural analysis, evaluation, and interpretation. The chapter explains the specifics of each component.

Chapter four considers the clothing fragments found in association with *Vasa*'s human remains in reference to seventeenth-century Swedish culture. This chapter draws on documentary evidence to create complete, though fluctuating descriptions of seventeenth-century Swedish aristocrat and peasant fashions, which were derived from various components of French, Dutch, and German fashions. The chapter looks at the fully assembled outfits and each article of dress separately. Articles of dress include jackets, breeches, fasteners, underwear, stockings, adornments, straps, headwear, footwear, and handwear. Following detailed descriptions of each sailor garment, the chapter examines the archaeologically recovered sailor garments. This examination includes analyses of the clothing fragments' historical contexts, material compositions, constructions, designs, functions, distributions across the ship, and associations with human remains. To learn more about the artifacts' historical contexts, evaluation also incorporates a comparison of the artifacts to examples in period art.

The organization of chapter five is similar to that of chapter four. Instead of seventeenth-century fashions, however, chapter five considers the personal belongings that the average seventeenth-century person carried on his or her being at all times. These items include cutlery, hygiene materials, recreational materials, keys, and money. The chapter analyzes the historical placement, material, construction, design, and function of each of these personal items. It also examines the lineage and historical significance of the utilitarian items used on ships. These items include tools, lanterns, and weaponry. After assessing the period's common personal belongings and the practical items used on a ship, chapter five individually evaluates the personal belongings and utilitarian items found in association with the human remains of *Vasa*. This, again, includes not only analyses of artifact historical context, material, construction, design, function, distribution across the ship, and association with human remains but also a comparison of the artifacts to examples in period art.

The goal of chapter six is to answer the seven above-mentioned research questions; it outlines the interpretations of this study. The chapter describes a generalized seventeenth-century Swedish sailor, detailing what the typical *Vasa* mariner wore and had on his person on a regular basis aboard the ship, why he had these materials, and how he obtained these materials. Within this analysis, the chapter reveals the few items that set the sailors apart—the utilitarian items, or the tools of the trade. Next, the chapter individualizes the sailors by looking at their general location and the style, design, utility, construction, material, quantity, and quality of their clothing garments, personal belongings, and utilitarian items. It also considers how sailors used their appearance to generate or reinforce cultural identities and the similarities and differences between Swedish and non-Swedish sailor attire. Finally, chapter seven discusses the ultimate implications of this research, including the limitations of the research and future directions for analysis.

A note on terminology: The words “seamen,” “sailor,” and “mariner” are used interchangeably throughout this thesis. All three terms refer to men whose job it was to work as members of a ship’s crew, able seamen and inexperienced conscripts. Similarly, the terms “dress,” “fashion,” “clothing,” and “attire” are used interchangeably to mean clothes.

CHAPTER 2: THE ILL-FATED VASA

“Men of sense often learn from their enemies…It is
from their foes, not their friends, that cities learn
the lesson of building high walls and ships of war.”
(Aristophanes, *The Birds* 1.1.483-489).

The goal of this chapter is not only to contextualize the *Vasa* and its sailors within both the larger society of Sweden and the Swedish navy but also to contextualize *Vasa*’s human remains and their associated clothing and possessions within the ship. At the time of *Vasa*’s commission, the 1620s, Sweden was beginning its Age of Greatness; it was being transformed into a fully functioning military state. This transformation greatly affected the *Vasa* and its crew, ultimately leading to the *Vasa*’s construction. Thus, the clothing and belongings associated with *Vasa*’s human remains cannot be fully interpreted without first understanding their historical context.

In order to draw any conclusions about the *Vasa*, its human remains, and their associated clothes and belongings, it is also necessary to understand how the ship and the collection reached their current states. The site formation processes, including the process of wrecking, influenced the initial position and preservation of the human remains and their associated artifacts. Then, the 1950s-1960s recovery and archaeological excavation of the wreck completely altered that original context. Consequently, these early studies form the basis for all future analysis and interpretation, including this research.

The following sections explore the socio-political history of late-sixteenth to late-seventeenth-century Sweden, including the rise of a powerful Swedish Navy under Gustav II Adolf; the construction and untimely loss of the *Vasa*; the recovery and excavation of the warship; the reclamation and study of *Vasa*’s human remains; and the effects of site formation processes on the artifacts associated with those human remains.

HISTORICAL CONTEXT

At the start of the Early Modern Era (1520-1800), Sweden was a poor and underpopulated Baltic state. Sweden's existence was in peril, as it competed territorially with other Baltic powers (Lockhart 2004:2). Despite the odds, between 1520 and 1660, the Swedes, under the guidance of the Vasa dynasty, formed an effective dynastic military state. The Vasa dynasty, consisting of 10 rulers, presided over Sweden from 1523 until 1718 (Glete 2002:177).

Sweden was ahead of most European countries in developing an efficient state in the late sixteenth century for five key reasons. First, Sweden was the only Northern European country that maintained a permanent army and navy in the sixteenth century. Second, the state was backed by a tax-raising organization. Third, the state reached outside its territorial boundaries. Fourth, the government could raise taxes without revolts and civilian wars. Finally, Sweden could maintain a navy in a harsh sailing environment, the Baltic Sea (Glete 2010:26-27).

Before the rise of fiscal military states (centralized, complex organizations that based their fiscal policies or economic models on sustaining their armed forces for long-term warfare), states maintained small armies and lacked permanent navies. There were no organized structures to recruit, arm, train, and mobilize the armed forces. Elite military positions were based largely on social status. With state formation in the late fifteenth and early sixteenth centuries came centralized power systems. Uniformity in jurisdiction, taxation, and economic policy followed (Glete 2002:10-15). To be successful, a centralized authority needed to not only raise internal resources, such as manpower, social authority, and commodities, but also organize and utilize them efficiently. Early states acted as protection sellers. They sold protection against violence—external and internal threats—by increasing taxes. These taxes—resources provided by society—were used to enhance the armed forces, which, in turn, enforced protection. This cyclical practice represented a contract between the people and the central authority (Glete 2010:4-12; Lane 1979).

A significant component of state formation that developed in Europe during the sixteenth and seventeenth centuries was the division yet ultimate coordination of fiscal and military organizations. Within the fiscal military state, the fiscal bureaucracy, represented by the local elite taxpayers, lacked control over the military, and the permanent armed forces could not use the taxes to their advantage. Although the routines of raising resources and controlling violence remained separate in terms of control and patronage, they remained connected at the central, state level. The central authority served as a moderator, transforming the resources supplied by the fiscal organization and distributing them to the military. Four factions, the fiscal organization, the armed forces, the dynasty, and society, maintained a mutual dependency. Authority-based positions existed alongside bureaucracies, allowing for a more efficient utilization of resources (Glete 2010:9-10).

Gustav I (r. 1523-1560), the first king of the Vasa dynasty, set forth domestic reforms, which established a centrally controlled system for social administration, created a permanent army from the militia, and began development of a modern gun-armed navy. While Gustav I rarely used his armed forces, his three sons Eric XIV (r. 1560-1568), Johan III (r. 1568-1592), and Karl IX (r. 1599-1611) waged many wars, including conflicts with Denmark-Norway, Poland-Lithuania, Lübeck, and Russia (Glete 2002:177-86). Under these early Vasas, three factors influenced Swedish foreign policy: 1) the country's territorial encirclement, 2) the decline of the Hanse and fall of the Teutonic Order, and 3) the growth of Baltic trade internationally (Lockhart 2004:19).

When 17-year-old Gustav II Adolf (r. 1611-1632) succeeded Karl IX in 1611, Sweden faced wars with Russia (the Ingrian War [1610-1617]) and Denmark-Norway (the Kalmar War [1611-13]). In addition to two potentially disastrous wars, Gustav II Adolf faced the legacy of his father, who, fearing nobles supporting the deposed king Sigismund (r. 1592-1599), had managed to alienate, expel, or behead a majority of the aristocracy. The aristocracy saw Karl's death as an opportunity and refused to recognize Gustav Adolf as Karl's successor unless he agreed to abide by the terms of a coronation charter set forth in January 1612. The Charter of 1612 required that the king consult with the Royal Council and Parliament before raising taxes, conscripting soldiers, passing laws, and making decisions concerning foreign policy, such as declaring war. Additionally, positions in the Council and all major civil and military offices were restricted to Swedish-born noblemen. Knowing that support of the aristocracy was necessary in times of war, Gustav II Adolf accepted their terms. He subsequently appointed Axel Oxentierna, a distinguished aristocrat, as chancellor. Oxentierna's composed and sensible personality served as the perfect counterpart to the boldness and ambition driving Gustav II Adolf. Their coalition provided stability for an overtaxed and turbulent Swedish population (Lockhart 2004:23-25).

In 1617, Gustav II Adolf concluded peace agreements with Denmark and Russia, which included a large ransom for the Älvsborg fortress. Then, in 1621, Gustav II Adolf began an expansionist drive against a more vulnerable Poland-Lithuania. Eastern expansion continued until 1629, when the king decided to free his military for conflict in Northern Germany. Protestant Sweden joined the main theatre of the Thirty Year's War in July 1630 against the Hapsburgs and their Catholic allies (Glete 2002:186-187). Social scientist Eric Ringman suggests that Gustav II Adolf immersed Sweden into international politics to prove Sweden's strength before the world. He wanted Sweden to be a "major 'player' on the world 'stage,'" a great power in its own right (Lockhart 2004:40). Amidst this constant warfare, Gustav II Adolf rapidly issued military and administrative reforms. Glete labeled Gustav II Adolf as "the most important military and political innovator in Europe in his generation" (Glete 2010:658).

Gustav II Adolf and Oxentierna promoted a new administrative structure. Between 1618 and 1634, the central administration was divided into five departments: 1) the Chancellery, 2) the Treasury, 3) the Court of Appeal, 4) the army, and 5) the navy. A board led by Council members presided over each department, and each one was given a predetermined amount of resources for a specific purpose. The board oversaw the efficient use of resources, making operational and bureaucratic decisions for its department. The king, however, retained control over the armed forces as commander-in-chief, appointed board members, and approved all budgets. Budgets were based on expected tax and custom incomes. This division of the central administration made the state less dependent on the king. The administration could survive the king's long absences, such as his two-year participation in the Thirty Year's War (Glete 2010:290-291). The reforms of Gustav II Adolf created a completely militarized country.

As a militarized country, Sweden maintained the most effective army in Northern Europe, an army equal to the great continental powers. Overall, Sweden was divided into eight recruiting areas, each consisting of 2-3 provinces. Every province raised one regiment. Three field regiments equaled six squadrons of 408 men plus officers (Kirby 1990:140). During wartime, royal revenues supported the army, but in peacetime, individual soldiers were housed on local farms. Officers resided on their own estates (Lockhart 2004:33-36). Employing and improving upon the Dutch tactical reforms of Maurice of Nassau, Gustav II Adolf transformed his individualized soldiers into an amalgamated, competent, militant unit. He improved the dexterity, firepower, and stamina of his infantry, and he enhanced the loyalty and adeptness of his cavalry (Lockhart 2004:34-35).

The other principal feature of the Swedish military was a navy that could match other Baltic powers. Glete suggests that states created sailing navies to protect their own countries and eliminate communication and trade between domestic resistance groups and external adversaries (Glete 2002:19). Sweden's location made an experienced fleet essential. Gustav II Adolf and Oxentierna began restructuring the Swedish fleet following the peace treaty with Denmark-Norway. One aim of the reformers was to make the navy a more effectual, concentrated force at sea during the spring, summer, and fall months by advancing the quality of the fleet, augmenting the crew's discipline, and equipping vessels with skilled leaders. A secondary aim was to strengthen the fleet's performance in amphibious operations. The newly appointed admiral of the realm, Karl Karlsson Gyllehiem, and his assistant Klas Larsson Fleming governed the navy's restructuring (Lockhart 2004:35).

On 1 January 1618, Gustav II Adolf and Oxentierna issued a new conscription order. They wanted to increase the number of domestic soldiers and seamen. All healthy and well-behaved men between the ages of 18 and 48 were eligible for military service, and all men between the ages of 15 and 60 who had previous naval experience could be called up (Fred Hocker 2014, pers. comm.). The men were grouped into local *rotar*, which maintained 10-20 men each. During conscription, only one man from each *rotar* was drafted into the army or navy (Lybeck 1942:338; Lockhart 2004:33). Between 1624 and 1634, a city could avoid conscription and taxes by recruiting and paying for a fixed number of volunteers. Few cities managed to meet this obligation (Glete 2010:598-599). In order to prevent the loss of valuable men in underpopulated, rural communities, a panel consisting of a chief justice, a district judge, the county board, the sheriff, and a priest chose which men to send (Lybeck 1942:338; Lockhart 2004:33).

Later, in 1627 and 1628, the government established additional regulations that required conscripted men to move their families and possessions to Stockholm. This allowed for rapid mobilization (Lybeck 1942:338). This system of conscription created a truly royal army. The men were subjects and soldiers of the crown. Furthermore, before 1630, Gustav II Adolf rarely employed mercenaries (Lockhart 2004:33-36).

Between 1624 and 1628, 2,300-2,400 men served in the Swedish Navy. Of those, 2,100-2,200 served as common seamen. The number of seamen on a ship depended on the size of the ship and the number of guns. Along with the seamen, the army supplied an infantry unit to each man-of-war for hand-to-hand combat and to serve the guns. By 1628, at least 58 percent of the men serving in the Swedish Navy were army soldiers. The actual percentage varied from ship to ship (Glete 2010:585-586,599). A majority of the seamen were inexperienced with ships and war. In the later 1620s, the navy expected about 85% of mariners to be conscripts (Fred Hocker 2014, pers. comm.)

During the 1620s, Gustav II Adolf also established the first permanent officer corps. He formally organized the careers and chains of command and decided to permanently retain enough naval leaders to maintain a mobilized fleet. Seventeenth-century Swedish ships maintained a three-tiered system of leadership, consisting of petty officers, non-commissioned officers, and commissioned officers. Petty officers were experienced, common seamen, who had earned the respect of their fellow seamen. Upon promotion to the rank of petty officer, the able seaman received better wages, but he did not gain social standing. Petty officers served as guides for the newly appointed seamen (Glete 2010:609,627).

The Swedish Navy permanently employed non-commissioned officers. Unlike petty officers, non-commissioned officers held a certain standing in society. Aboard the ship, they had the privilege of dining in the commissioned officers' quarters. Non-commissioned officers specialized in one of three positions: master, navigation officer, or master gunner. There were four ranks of masters, three ranks of navigation officers, and two ranks of master gunners. Masters were in charge of maneuvering the sailing ship and maintained the ship, sails, cables, rigging, and ship's equipment. Navigation officers navigated the ship at sea, using navigation instruments. They had to know how to steer the ship and how to use the sails to maintain a predetermined course. Master gunners supervised the gunners and maintained guns and ammunition. Non-commissioned officers served as the professional leadership aboard Swedish naval vessels (Glete 2010:609-612).

Commissioned officers were members of a high social class. They typically gained their position because of their social connections, not their professional merit (Glete 2009:609-612). The Swedish Navy appointed some men to admiral who had never set foot on a ship before. They were the sons of officers, civil servants, burghers, and priests. Social status and corresponding political and social alliances mattered because a major responsibility of admirals was administration. These inexperienced, non-professional officers relied heavily on the non-commissioned and petty officers for fleet leadership. To promote skilled seamen to admiral, the government had to ennoble them. Throughout the sixteenth and seventeenth-century, the average ship had one to two commissioned officers (Glete 2010:609-613,628).

The commissioned officers only had two ranks, captain and lieutenant (Glete 2010). In the 1620s, there were two grades of captain, upper and lower, but the lower grade captains far outnumbered the upper grade captains. Despite their infrequency, two upper grade captains were aboard *Vasa* (Fred Hocker 2014, pers. comm.). After 1650, the rank of lieutenant was divided into 1st lieutenant and 2nd lieutenant. By 1634, the Swedish Navy had 35 captains and 40 lieutenants. By the end of the century, a man had to serve as a non-commissioned officer before being promoted to the rank of lieutenant. This allowed officers to gain an understanding of ship handling, navigation, and gunnery (Glete 2010:627-631).

Above the rank of captain, the Navy employed flag officers. Only a few flag officers existed before 1630. Between 1628 and 1630, Gustav II Adolf established four ranks of flag officers. The *riksamiral* served as the first squadron's commander and the fleet's commander. Each squadron maintained three commanders. Admirals served as the first commanders, rear admirals served as the second commanders, and vice admirals served as the third commanders (Glete 2010:632).

During the reign of Gustav II Adolf, the two primary objectives of these Swedish naval officers and their subordinates were power projection against territories in the Eastern Baltic and blockading. Due to its geopolitical location, Sweden depended upon the sea for communication and external trade (Glete 2002:180-181). By dominating the sea-lanes, the Swedes could easily transport men, cargo, and trade goods. A foremost constituent of controlling the sea-lanes was retaining important commercial ports via occupation. Seizing a port allowed the Swedes open access to their enemies' resources, while denying their opponents an opportunity to obtain theirs. The navy constructed an assortment of small craft to patrol coastal and inland waterways, while larger vessels guarded the open sea (Glete 2010:37-39). Swedish warships were purpose built for the Navy and owned by the state. The Swedish ships had to be capable of not only facing single ships of equal strength but also defending themselves against multiple ships in action.

Large fleet actions were rare; instead, the sailors relied largely on their own ship's firepower and weatherliness (Hocker 2006:38-39).

In the case of seventeenth-century Sweden, it is difficult to isolate the navy from the army. They were cooperative units. Unlike Denmark, Sweden's army did not rely on the navy for survival. Without control of the sea, however, the army could not win. As previously suggested, the navy could transport men, weapons, and supplies in controlled waters. Not worrying about the coastline allowed the army to expand their operations inland, while limiting their enemies' movement (Glete 2010:39-46).

Under Gustav II Adolf, the navy became more than a transport and logistical force, it became an amphibious assault force. During amphibious operations, the navy provided tactical mobility and fire support to the army in shallow coastal areas, rivers, deltas, and sheltered waters using galleys and other small watercraft. Meanwhile, the larger warships provided support offshore. Gustav II Adolf launched his first major amphibious operation in 1621 against Riga. The assault included 11,000 soldiers and the entire navy. The success of the attack convinced Gustav II Adolf to employ amphibious warfare in all his offensive actions from 1621 until his premature death at Lützen in November 1632 (Glete 2010:97-102).

VASA*'S CONTSRUCTION AND LOSS*

Before 1600, Swedish ship construction was dominated by Swedish-born, navy-trained shipwrights, who employed the familiar Baltic-Nordic tradition. Desiring a shift to warships that could hold an abundance of heavy guns high in the hull without impairing the ship's sailing capacity, the Swedes began looking outside Sweden for trained specialists. While the Danes recruited English and Scottish shipwrights, Sweden turned to the Netherlands because the Dutch provided innovative and desirable technology and economic efficiency. Within two decades, Dutch methods of construction dominated, and the navy regularly employed Dutch shipwrights in yards. Among these great shipwrights were Isbrand Johansson and Henrik Hybertsson, who alternated as the senior master of the Stockholm dockyard from 1602 to 1627. By 1618, the two men were the only shipwrights used by the navy for new building projects (Glete 2010:337-338).

Starting in 1618, Sweden shifted from a decentralized shipbuilding system, in which the navy dispersed new ship construction to yards around Sweden's coast. Naval shipbuilding became concentrated in a few yards, which used teams of experienced shipwrights and unskilled Swedish-born laborers. From then on, the navy only employed the decentralized system during times of need (Glete 2010:283-284, 396). In addition to a centralized system of shipbuilding, the king and chancellor adopted a new form of shipyard administration. The production and upkeep of all warships and associated objects were contracted out to private entrepreneurs. This arrangement, known as an *arrende*, gave a private entrepreneur control over the shipyard and a quota of vessels, armaments, sails, or other naval goods to build and maintain. The crown provided the entrepreneurs with cash sums to procure raw materials and laborers for production and upkeep (Hocker 2006:40).

Before 1620, Sweden maintained a "small ship navy," consisting of warships with a single gundeck. Gustav II Adolf changed this strategy, ordering the construction of two, two-decked men-of-war with heavier guns at Skeppsholmen, the Stockholm dockyard, on January 10, 1625. Gustav II Adolf named Henrik Hybertsson and Arendt Jakobsson, holders of the *arrende* for Stockholm dockyard. The final contract included the construction of not only the two, two-decked men-of-war but also two smaller vessels, modeled after a previously constructed warship *Gustavus* (Hocker 2006:41-42).

Henrik Hybertsson designed the ships and served as dockyard supervisor, handling the managerial matters of the project, while two master shipwrights Henrik "Hein" Jacobsson and Johan Isbrandsson directly handled construction. Arendt Hybertsson, a purchasing agent and administrator, was in charge of purchasing raw materials on the open market. As his health began to decline, Henrik Hybertsson turned over all practical responsibility in early 1626 and subsequently died sometime between March 1626 and May 1627. Margareta Nilsdotter, Henrik Hybertsson's widow, officially inherited his half of the contract and became manager of the shipyard. There is no evidence, however, that she took an active role. Instead, Hein Jacobsson stepped up as master shipwright and Arendt Hybertsson took over as chief administrator (Hocker 2006:41-42).

In the spring of 1627, Jacobsson and Arendt Hybertsson likely launched the nearly completed *Vasa*. Construction would have been completed through the upper gundeck. Gustav II Adolf boarded *Vasa* for the first and last time in January 1628 for an official inspection. Upon receiving the king's approval, the shipwrights finished the vessel by late spring 1628. On completion, according to modern archaeological measurements, *Vasa* was approximately 69 meters long, contained two gundecks, and mounted a broadside throwing well over 750 pounds (Hocker 2006:44-49). It was the newest and most powerful warship in Northern Europe, a symbol of the future prestige and power of Sweden and Sweden's king Gustav II Adolf.

Before *Vasa* sailed, a ship stability demonstration was conducted for Admiral Klas Fleming. This demonstration consisted of 30 sailors running from one side of the ship's upper deck to the other. The plan was to make six full crossings, but *Vasa* began dangerously rolling by the third crossing. Despite the ship's instability, Klas Fleming and the ship's newly appointed captain, Söfring Hansson, pushed forward because the absent Gustav II Adolf ordered the ship's immediate commissioning (Hocker 2006:53).

In July 1628, Gustav II Adolf assigned *Vasa* to a squadron based at Älvsnabben. The ship and its crew were to report there along with three other capital ships: *Stora Kronan*, *Gamla Svårdet*, and *Äpplet*. The short passage to Älvsnabben was began on August 10, 1628. At departure, the vessel was neither fully outfitted nor provisioned. In accordance with manning projections for 1628, little more than one-third of the crew—133 of 433 men—were supposed to be on board for the opening voyage. Newly appointed vice admiral of the squadron, Erik Jönsson, and a supernumerary captain, Hans Jonsson, were also on board, along with several guests of the crew (Hocker 2006:52-53).

Vasa cast off in the late afternoon, firing a salute from several of its guns. Just past the Söder Bluffs, a gust of wind filled the sails, causing the ship to heel to port. The ship righted itself, but when a second stronger gust hit the slowly moving warship, it heeled further to port, submerging the lower, open gunports. Water poured into the vessel, filling the port side of the gundeck; the ship could not right itself. As seamen scrambled to get out, the ship foundered and came to rest on the bottom of the harbor at a high list. Approximately thirty individuals died, including at least one officer, Captain Hans Jonsson (Hocker 2006:53-54). Vasa sank because, as the earlier stability demonstration suggested, it was unstable in the configuration in which it was sailing that day. It was unstable because weight was poorly distributed within the hull. This in combination with the windy weather should have been considered before its lower gunports were opened (Hocker 2006:58-60).

RECOVERY AND EXCAVATION

Three days after the ship foundered, the Swedish Privy Council issued a letter authorizing Ian Bulmer, an English engineer, to attempt a recovery. Two additional individuals were assigned the task after Bulmer, but they all failed. Klas Fleming hired divers to assist in the lifting with little success. More salvage attempts were made throughout the 1630s, 1640s, and early 1650s, but none succeeded. In 1658, Hans Albrecht Von Treileben, a Swedish officer, introduced the diving bell to Sweden, which permitted divers to work at deeper depths for extended periods. Between 1663 and 1668, Treileben employed divers and the dive bell to salvage at least 53 guns and 30 wagonloads of timber from *Vasa*. The men removed the upper deck planking and broke or removed (not to the surface) several deck beams. J. Liberton concluded seventeenth-century salvage attempts in 1683, removing a single 24-pound cannon (Hafström 2006:68-107).

During the 1860s and 1870s, the Stockholm Diving Company relocated the *Vasa*. At the time, the company was engaged in operations both to make shipping lanes less cluttered with wrecks, anchors, and chains and a salvage operation of the Swedish warship *Riksäpplet*. While *Vasa* was not subjected to salvage, the company damaged the wreck during their operation, especially with anchors (Cederlund 2006a:121-125). Though people knew where the wreck was located, *Vasa* sat largely untouched and unexplored for the next fifty or so years. Naval dives may have been conducted on the ship in the 1930s. On August 25, 1956, after years of searching, naval engineer, Anders Franzén and head diver Per Edvin Fälting rediscovered the warship's resting place (Cederlund 2006a:139).

Initial dive operations occurred during September 1956. Divers took rough measurements and recorded their observations. According to naval divers, the wreck rested approximately 32 meters below the surface and was partially buried within 3 to 4 meters of sediment. The bow was pointing westward, toward Waldemarsudde. Initial thoughts of raising the entire ship commenced. In 1957, the *Vasa* Committee was established, which created an institutional framework for the research. A formal system of record keeping followed. As a Swedish warship, ownership of *Vasa* fell to the state—the Swedish navy. The Naval Office entrusted the find to the National Maritime Museum (Statens Sjöhistoriska Museet, SSHM). A committee, established by the Vasa Project's three primary contributors—the Navy Office, the National Heritage Board (NHB), and SSHM—was assigned the job of determining if *Vasa* was salvageable and whether salvage could be conducted in a scientific manner (Cederlund 2006b:190). The *Vasa* Committee recommended that divers only proceed with the first stage of salvage. The Navy Office would control salvage, while divers sent loose artifacts to SSHM and NHB for conservation. In 1959, the three organizations decided a full-scale archaeological investigation was necessary, and they created the *Wasa* Board to oversee it (Cederlund 2006b:195-196).

Recovery of the *Vasa* commenced by digging six tunnels beneath the hull. Divers employed a high-pressure water jet—Zetterström nozzle—to cut through the clay within the tunnels. When diggers came across artifacts, they avoided them if possible. If forced to remove them, they recorded the tunnel number and side. A wire basket attached to the hose captured smaller artifacts. Two cannon and the rudder were also removed. Over the course of four days, divers drew slings through the completed tunnels. Salvagers attached the slings to two lifting pontoons. They pumped water into the pontoons until they sat low in the water. The slings tightened as the pontoons gradually drained; as the pontoons ascended so did *Vasa*. Suspended beneath the pontoons, the ship could be transported to new locations. It took 18 lifts to reposition *Vasa* 190 meters off the northern shore of Kastellholmen at a depth of 16-17 meters. Here divers replaced the long slings with shorter, tauter slings, preparing for the final lift. The man-of-war sat there for one and a half years (Cederlund 2006c:217-265).

Before the final lift, divers dredged and cleared *Vasa*'s upper gundeck in an effort to reduce the ship's weight. Salvagers recorded artifacts, including five sets of skeletal remains, according to the side of the ship where they were found and the nearest deck beam. Divers cleared away three pump shafts and removed excess silt inside and outside the wreck to prepare for the lift. To make the vessel watertight, divers reconstructed the shattered portions of the stern, boarded up the gunports, and plugged all holes. On April 24, 1961 at 9:00 a.m., *Vasa*'s starboard side broke the surface. Archaeologists began their excavations the next day. Following continual pumping and further caulking, salvagers docked *Vasa* ten days later (Cederlund 2006f:276-290).

Eleven archaeologists and two museum staff members conducted archaeological excavations between April and September of 1961. Three decks above the hold (HS) remained intact and a portion of the upper or main deck had survived. The decks were labeled as follows: upper deck (ÖD), upper gundeck (ÖB), lower gundeck (UB), and orlop (TD). Records of excavation included a daily site diary, a find log, photographic documentation, plan and perspective drawings of find environments (not comprehensive), personal accounts, and journals. All decks, except the upper gundeck, retained two layers of sediment, a clay layer that contained most artifacts and a layer of sludge above it. To remove the sludge, archaeologists pumped out the upper decks and drained out the hull from the ship bottom. They uncovered artifacts using a hand-held water spray (a garden hose), and they sieved all silt to catch smaller artifacts, such as buttons. Each deck was excavated as a separate entity. Spaces between deck beams represented an archaeological unit, and researchers excavated two to three units at a time (Hocker and Cederlund 2006:292-300).

The excavators registered 14,034 finds, but they were not all discrete, as each coin in a large group of coins received the same artifact number. Archaeologists numbered finds sequentially from 6001. Numbers under 6001 were assigned to finds retrieved during salvage, although there are exceptions. To record location, they used the deck beams. The distance from the forward face of each beam was measured to the inner face of the stem. Archaeologists marked the find location by noting the beam measurement if the object was found under a specific beam or a range if it was between two beams. For example, on the lower gundeck, beam 13 is 21.97 meters from the stem and beam 14 is 24.53 meters from the stem. The location of an object under beam 13 was recorded as 2197 cm, and the position of an object between beams 13 and 14, such as Helge's skeleton, was recorded as 2197-2453 cm. Archaeologists further designated the deck and side of the ship—port (BB), amidships (MS), and starboard (SB) (Figure 1). In the 1990s, scientists renumbered the coins, creating more distinction.

The final discrete artifact count as of April 2014 is 40,000 (not including ballast stones) (Fred Hocker 2014, pers. comm.). The *Vasa* now resides on the island of Djurgården in the most visited maritime museum in the world, Vasamuseet. Since its recovery in 1961, scientists and volunteers of the *Vasa* Project have continually researched the warship and its associated artifacts.

HUMAN REMAINS ABOARD **VASA**

During salvage and excavation, researchers discovered over 1,500 human bones in and around the wreck. Professor Nils-Gustof Gejvall performed a preliminary anthropological study

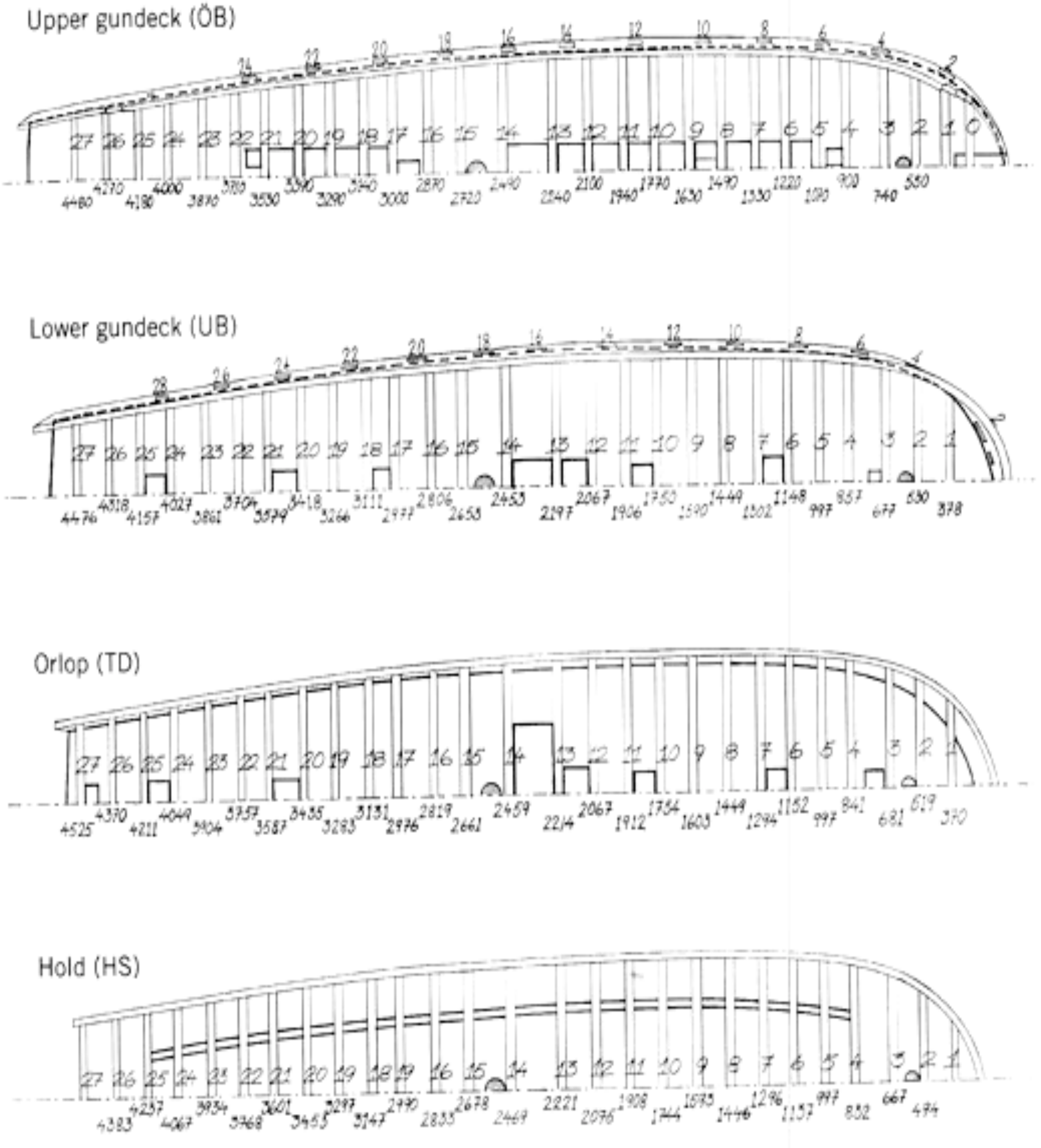


Figure 1. Schematic plans with deck beam numbers and distances from deck beams to the stem in centimeters (Hocker and Cederlund 2006:301).

of the bones found in the ship before the museum interred the remains in a memorial crypt in 1963. After Gejvall's study, archaeologists discovered four skeletons outside the wreck. Vasamuseet disinterred the initial remains in 1989 and delivered all the remains to Professor Ebba During of the Archaeological Institute of Osteology to complete a systematic osteological study. She claimed the bones represented 25 individuals, and she provided each individual, alphabetically, with a name based on the Swedish standard radio code, starting with Adam. Of the 25 personages, four were found relatively intact and localized: Filip, Helge, David, and Gustav. The remaining individuals are made up of more scattered remains. Professor During proposed that the 21 remaining skeletons suffered from a great deal of disturbance (During 1994:77-144).

Recent analysis contradicts During's findings, suggesting most skeletons were not greatly disturbed. The exceptions are Beata, Cesar, and Erik, whose skeletons fell downward through hatches as salvagers used water jets to clear the upper gundeck between 1959 and 1961. Archaeologists found Erik's bones on the upper gundeck, the lower gundeck, the orlop, and the hold. Current researchers further conclude that the bones found with Vasa actually represent seventeen incomplete skeletons, not 25. Two individuals consist of only a few bones (Hocker 2003:3). The identification and location of the other 15 individuals, whose personal belongings represent the primary data for this thesis, are summarized in Table 1 and illustrated in Figure 2.

A CONTEXT OF USE

The *Vasa* provides a rare opportunity for maritime archaeologists. Muckelroy suggests that the first step in the site formation process is the "process of wrecking" (Muckelroy 1978:169). *Vasa*'s wrecking, as previously suggested, is an exceptional case. While most

Table 1: General Location of *Vasa* Skeletal Remains

Skeleton	***Location***
Adam	**ÖB, SB, Beams 5-6, 1100 cm from forward**
Beata ∆	**ÖB, BB, Beams 5-9, 1100-1600 cm from forward**
Cesar ∆	**ÖB, SB (Beam 4, 900 cm from forward) & BB (Beams 6-9, 1300-1600 cm from forward)**
David	**ÖB, SB, Beams 14-15, 2490-2720 cm from forward**
Erik ∆	**ÖB, SB-MS, Beams 16-19, 2870-3290 cm from forward** **UB, SB, Beams 18-20, 3120-3270 cm from forward** **TD, BB, Beams 16-18, 2820-2980 cm from forward** **(Beams 18-19, 3130-3280 cm from forward)** **HS, BB, Beams 14-20, 2650-3300 cm from forward**
Filip	**ÖB, SB, Beams 22-24, 3710-3930 cm from forward**
Gustav	**UB, SB, Beams 10-13, 1900-2070 cm from forward**
Helge	**UB, BB, Beams 13-14, 2197-2453 cm from forward [GP 16]**
Ivar	**TD, BB, Beams 1-2, 370-520 cm from forward** **HS, BB-MS, Beams 0-3, 0-670 cm from forward**
Johan	**HS, SB (Beams 6-9, 1140-1500 cm from forward) & BB (Beams 3-7, 670-1140 cm from forward)**
Ludwig	**UB, MS, Beams 13-14, 2200-2400 cm from forward** **HS, MS (Beams 11-13, 1908-2221 cm from forward) & SB (Beams 10-11, 1750-1900 cm from forward) & BB (Beams 10-15, 1750-2680 cm from forward)**
Rudolf ◊	**BB, Stern, 3700 cm from forward to the end of the ship (including tunnels E & F), BB Quarter Galleries (Låring)**
Sigurd ◊	**BB, Stern, 3700 cm from forward to the end of the ship (including tunnels E & F), BB Quarter Galleries (Låring)**
Tore ◊	**BB, Stern, 3700 cm from forward to the end of the ship (including tunnels E & F), BB Quarter Galleries (Låring)**
Ylva ◊	**BB, Stern, 3700 cm from forward to the end of the ship (including tunnels E & F), BB Quarter Galleries (Låring)**

◊ = Outside of Vessel ∆ = Disturbed During Salvage

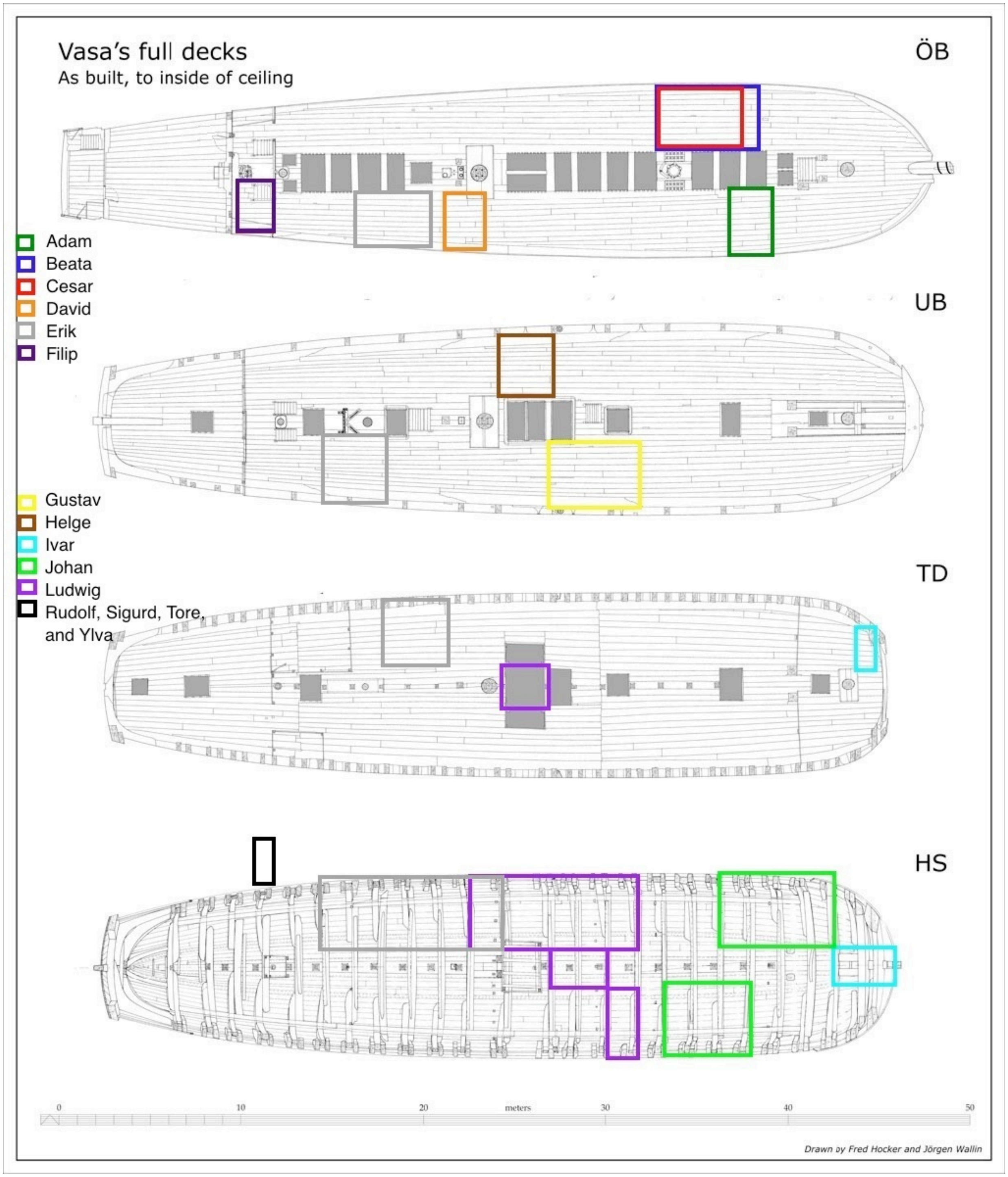


Figure 2. Distribution map of Vasa skeletal remains (Ship's plans by Fred Hocker and Jorgen Wallin).

wrecks suffer damages during wrecking, *Vasa* simply filled with water, sank intact, and sat largely undamaged for centuries. Many argue that shipwrecks, a product of an unexpected catastrophe, represent a time capsule in which a community is frozen. This is often not the case because of site formation processes (Muckelroy 1978:52-57). *Vasa*, however, is in many ways a time capsule. Until *Vasa*'s recovery in the late-1950s to early 1960s and the ensuing archaeological excavations of the ship, *Vasa* and its associated artifacts maintained a near perfect context of use. The twentieth century appearance of the lower decks in particular retained the final layout of the ship and its contents once they had sank into the seventeenth-century soils of Stockholm Harbor. The only major alterations came with the aforementioned seventeenth-century cannon recoveries and the inadvertent nineteenth-century damage by the *Riksäpplet* salvage crew.

One component of this 'time capsule' is the array of skeletal remains. Each skeleton and its associated clothing and effects started out as a single entity, but now each skeleton and its personal belongings represent more than 200 individual objects. The individual's locality at death and their position on recovery most likely coincide because, unlike most shallow sites, there is an ambient pressure of 3-5 atmospheres at *Vasa*'s original depth. This prevents a rapid increase of internal pressure within the body and subsequent swelling. In addition, the water is extremely cold, which slows the enzyme reaction that generates decompositional gases that cause bloating. Therefore, the bodies would have not gained the buoyancy needed to float out of position. Instead, the remains decayed in place as Stockholm's fish and crustaceans consumed them from the outside. Fortunately, these creatures are too small to displace large bones. Meanwhile, bacteria broke down the cells from inside the body (Hocker and Wendel 2006:152-153).

As the bodies decayed, associated objects may have been shifted slightly, but they can still be easily identified as that individual's personal belongings. Furthermore, all but two skeletons were found as individual sets, so there is no issue of group association, as on *Mary Rose*. Thus, the artifacts survived in a context of use (Hocker and Wendel 2006:152-153). Jonathan Adams, following David Gibbins, proposes that, in a context of use, archaeologists "have a much better chance of being able to discern relationships between individual objects, between assemblages of objects, and between these and the structures within which they were stored or used" (Adams 2001:296). In reference to *Vasa*, relationships between skeletal remains and nearby artifacts can thus be examined and interpreted.

CHAPTER 3: MATERIAL CULTURE FROM HISTORIC SHIPWRECKS

> "Artefacts from wrecks…relate to specific
> functions and the people on board, reflecting
> circumstances and lifestyle in a manner rarely
> recorded on terrestrial sites" (Redknap 1997:v).

Artifacts are not culture; they are products of culture. They are solid representations of the past. Thus, the underlying assumption in studying artifact assemblages, or material culture, is that artifacts reveal information pertaining to their parent society (Schlereth 1985:2-3). A ship represents a "closed community," which is reflective of its parent culture (Smith 1986:2). Once separated from the mother culture, however, the ship's customary culture is slightly modified to suit shipboard life. The mariners' diets, for instance, became reliant on victuals that could be stored on ships for extensive periods without putrefaction, and the lack of space prevented the use of beds or mattresses, requiring mariners to spread straw across the gundecks for bedding. Most knowledge concerning this lifestyle has been lost or stylized over time. Intact shipwrecks, such as *Vasa*, and their associated artifacts prove valuable in revealing the true nature of historic seamen. They actively reflect this once familiar lifestyle, allowing archaeologists to understand not only the ship's culture but also aspects of its former parent culture (Smith 1986:2).

In this study, material culture was defined as the objects associated with the human remains found aboard and around Vasa. Each individual skeleton and its surroundings represented a separate unit. These materials represented items that sailors kept on their person at all times or temporarily had in their possessions at the time of sinking. Analysis of these artifacts provided insights concerning the daily operations of a seventeenth-century floating community.

This chapter consists of the literature review and methodology sections of this thesis. It presents an overview of material culture theory and discusses nine maritime archaeological studies on sailor's clothing and/or personal possessions that were carried out in environments similar to *Vasa*'s. Using this theoretical foundation and various methods and interpretations from the case studies, a methodology is developed. This approach includes the identification, cultural analysis, generalization, and characterization of these artifacts.

MATERIAL CULTURE THEORY

Anthropologist Melville Herskovits defines material culture as "the totality of artifacts in a culture, the vast universe of objects used by human kind to cope with the physical world to facilitate social intercourse, to delight our fancy, and to create symbols of meaning" (Schlereth 1985:2). Material culture encompasses a wide range of man-made objects—clothing, tools, paintings, buildings, and ships. Natural objects that have been modified by humans, such as stones arranged into a wall, gardens, prepared meals, and tattooed bodies, are also labeled as material culture (Prown 1993:2). The discipline of material culture studies comprises the research of extant physical evidence in the interpretation of human behavior. It is the examination of materials to understand culture. A number of fields use data from material culture studies, including archaeology, anthropology, cultural geography, folk life studies, social and environmental psychology, and social history. Research typically involves the collection, identification, comparison, and categorization of artifacts (Schlereth 1985:2-4).

In America, interest in material culture began in the late nineteenth century among early intellectuals, including curators, museum founders, folklorists, and antique dealers. According to Thomas J. Schlereth, material culture studies have subsequently progressed through three overlapping phases of study: the Age of Collection (1876-1948), the Age of Description (1948-1965), and the Age of Interpretation (1965-present). During the Age of Collection, scholars such as Joseph Henry, William Sumner Appleton, and Henry C. Mercer were only concerned with collecting and preserving objects that could be associated with famous people or events, were aesthetically pleasing, or had a unique design. They ignored everyday items made and used by common people (Schlereth 1985:6-20).

The Age of Description included scholars such as John A. Kowvenhoven, Fred Kniffen, and Charles F. Montgomery, who still collected aesthetically pleasing artifacts but were not necessarily concerned with famous people and events. Scholars of this age began developing systematic methods to record and analyze artifacts. Research focused on developing descriptive typologies, chronologies, and classification systems (Schlereth 1985:20-32).

It was not until the late twentieth century that scholars began to perceive the value of using material culture to understand human behavior within prehistoric, historic, and modern societies. Pioneering scholars of the Age of Interpretation include Peirce F. Lewis, John T. Schelebecker, James Deetz, Kenneth L. Ames, and Henry Glassie. Under their guidance, the modern age has witnessed a rise in the importance of vernacular culture. Historians and archaeologists, now, study people not previously mentioned in history books, such as women, slaves, peasants, and sailors (Schlereth 1985:6,32-43).

As the Age of Interpretation continues, material culture theory advances. Jules David Prown (1993:1) asserts that all forms of material culture, whether created or modified by humans, "reflect, consciously or unconsciously, directly or indirectly, the beliefs of the individuals who commissioned, fabricated, purchased, or used them and, by extension, the beliefs of the larger society to which these individuals belong." Material culture, however, does not just passively reflect the beliefs of individuals and societies because the production of material culture is a social practice. Social actors interact with their material environment rather than simply reacting to it; they manipulate the meanings of, or meaningfully constitute, material culture according to their own needs and interests (Dellino-Musgrave 2006:60-65). For instance, people may manipulate or negotiate material culture to communicate self-identity and group affiliation, along lines of gender, class, age, ethnicity, income, occupation, and nationality (Beaudry *et al.* 1991:153-155; Entwistle 2000:44; White 2008:17). In this sense, material culture cannot be separated from living, breathing, moving human beings (Entwistle 2000:9).

As Marxist archaeologist Randall McGuire (1992:104) has argued:

> Material culture entails the social relations that are the conditions for its existence. It exists not only in a context but it also helps to form it. It both structures human action and gives reality to the social ties that bind people together. It serves as a model of and a model for social action.

Objects carry meaning, or communicate thoughts, sentiments, images, and sensibilities (Davis 1992:4), but only 'as part of a network of relations that exist, or have existed, between many subjects and objects within a context of social relationships' (Walsh 1993:157 quoted in Dellino-Musgrave 2006:62). In other words, material culture is the personification of social relations. Hence, material culture, once placed in spatial, historical, and socio-cultural contexts (the contexts that influence perceptions and expectations), signifies a shared understanding of a society and groups within it (Dellino-Musgrave 2006:60-67). The *Vasa* and its associated artifacts are part of this personification, and their study will improve our understanding and interpretation of seventeenth-century Swedish sailors.

Quoting Mary Douglas and Baron Isherwood (1979:66-67), Mary C. Beaudry *et al.* (1991:154) advance this idea, suggesting that material objects "fix on their owners and users certain culture-specific attributes—in effect, they serve as 'the visible part of culture,' by 'making firm and visible a particular set of judgments in the fluid processes of classifying persons and events.'" Through artifacts people communicate to those around them who they are and what they are doing—their cultural identities and affiliations (Beaudry *et al*. 1991:154-155).

These various cultural identities are continuously generated, manipulated, and negotiated by actors in everyday practices, such as dress, and as such, like material culture, they are culturally and temporally situated (Butler 1990:139; Dellino-Musgrave 2006:59; Entwistle 2000:44). They are dependent on a particular *habitus* or milieu (Craik 1994:10). Yet, there is no reason to assume that an object is serving only one symbolic function. There is no absolute or essential meaning (Beaudry *et al.* 1991:157; Craik 1994:10). Rather, objects can "mediate a variety of meanings, often simultaneously" (Beaudry *et al.* 1991:157).

The identities that a person incorporates are linked to the positions they are assigned to or achieve within a social structure (Roach-Higgins and Eicher 1995:13). Since there are potentially infinite social relations, cultural identities are always incomplete, or put differently, cultural identities are open to change as life is experienced (Dellino-Musgrave 2006:59). Therefore, the identities of any one person, including those signified by material culture are uniquely personal (Roach-Higgin and Eicher 1995:12). By analyzing the ways in which individuals use material culture to facilitate judgment, classification, and self-expression, archaeologists can understand how individuals constructed their various cultural identities (Beaudry *et al*. 1991:154-155).

There are, however, inherent problems with the study of material culture, which researchers must always be aware of. First, it is impossible to completely reconstruct historical settings because explanations of the past are based on surviving data. Surviving objects are not representative of all genders, classes, or peoples. Historical evidence is in fact fragmentary evidence. For example, while a heavily constructed belt owned and utilized by a twelfth century English nobleman may have survived into this century, a cheaply constructed peasant belt would have likely disintegrated, leaving no trace of its former existence. Second, objects that have survived are often only fractions of what they once were. Over time, artifacts wear out, break down, or are damaged by humankind. The absence or unrecognizability of certain features prevents researchers from discovering the object's full meaning. Consequently, a researcher's understanding of material culture will always be an approximation (Schlereth 1985:9,14,23).

Third, material culture is not monoperspectival. John Dixon Hunt warns that each material culturalist brings a bit of himself or herself into their interpretation of an object. The researcher's culture inevitably influences his or her analysis of an object just as the creator of the object was influenced by his or her culture. The history of an object established by an American archaeologist of the twenty-first century will be different from the history of the same object established by an American archaeologist of the thirty-first century. Moreover, an art historian like Jules Prown may have a different interpretation than anthropologist W. David Kingery. Multiple approaches provide multiple translations, but this analysis is essential because it helps researchers fully comprehend the object's complexity (Hunt 1993:293-298). Each new idea reflects upon, adds to, or cancels out an earlier idea, providing researchers with a more comprehensive picture of the historical culture.

STUDYING THE MATERIAL CULTURE OF SHIPWRECKS

There are specific ways in which material culture theory can be applied to maritime contexts, such as *Vasa*. This section is an examination of the material culture studies that are most pertinent to this and other maritime archaeological projects. In order to see the progression of material culture research within a maritime context, this evaluation includes research from as early as the 1960s and as late as the 2000s. All of the selected studies consider material culture in an effort to understand shipboard life, and two examples incorporate materials found with human remains.

Between 1961 and 1964, researchers from the University of Pennsylvania completed underwater excavations on a seventh-century Byzantine shipwreck found off the Turkish island of Yassiada. The slim merchantmen sank to the bottom of the Chuka Channel in the southeastern Aegean Sea during the seventh century following a collision with Yassiada's 200 m long reef (Bass and van Doorninck 1982:3-4). Following a complete analysis of the shipwreck and its associated artifacts, which did not include human remains, researchers posed the question: "What can archaeological evidence suggest concerning the ship's crew" (Bass and van Doorninck 1982:313)? They turned to the seventh-century Rhodian Sea-Law lists and discovered that in addition to basic seamen a merchant vessel crew included a shipowner and/or captain, a helmsman, a prow officer, a boatswain, a ship's carpenter, and a cook. They found direct evidence of a shipowner, a boatswain, and a ship's carpenter. Following the discovery of an engraved bronze steelyard, the shipowner was identified as Georgiou Presbyterou Nauklerou (Georgios Elder, Owner/Sea Captain). The presence of the later two, on the other hand, became evident after the discovery of two separate, specialized tool kits.

The University of Pennsylvania researchers also discovered several utilitarian and personal items that revealed information about daily life aboard the vessel. First, considering the inventory of the ship's galley, researchers propose that the crew was divided socio-economically into officers and seamen. The former, along with the important passengers, employed finer tableware—glazed bowls, plates, and dishes. Seamen, noting the large quantity of cooking pots, far outnumbered the officers. Second, based on the discovery of a bronze incense burner alongside a bronze cross, archaeologists suggest that the Yassiada ship was Christian-operated, with some form of worship taking place onboard (Bass and van Doorninck 1982:188; 266-267). Third, one of the major past times of the crew, as evidenced by the large quantity of fishing weights, was sea fishing. Finally, on a more personal note, archaeologists discovered three bronze buckles and a belt tab aft of the ship's hold. One of the buckles was linked to the carpenter's gear, while the other three items may have belonged to other crewmembers. Researchers suggest these artifacts may represent remnants of crewmembers' stored apparel, perhaps shore-leave changes of clothing. One of the buckles was also quite small, suggesting it belonged to a boy. He was probably on board working his way up (Bass and van Doorninck 1982:277-278; 296). The terms applied to crewmembers and interpretations of artifacts are interesting. They strongly related to the terms and practices of nineteenth century ship life, a well-documented time in maritime history. As such, these researchers seemed to have accepted the conventions of the time, which projected the Victorian conventions of shipboard organization back into the past. They analyzed the materials within a set of preconceived notions about how shipboard communities should be organized, not letting the artifacts speak for themselves.

By the late 1970s, the practice of using Victorian conventions of shipboard organization to understand pre-nineteenth-century shipboard life was abandoned. Archaeologists started to let objects speak for themselves. They analyzed the artifacts, and then made interpretations about shipboard life. An early example of this form of analysis is the Institute of Nautical Archaeology's (INA) 1970s research on an eleventh century merchant ship in Serçe Limani, Turkey. The Serçe Limani ship crashed onto the rocky shoreline around AD 1025 after its starboard bower anchor snapped, setting it adrift. While most of the crew safely made it to shore, they left behind their personal possessions (Bass et al. 2004:3-6). One component of INA's full-scale excavation involved Bass and van Doorninck, Jr. interpreting ship life from the artifacts scattered across the sea bottom. Personal effects found aboard the Serçe Limani ship included grooming implements, whetstones, flat stone fragments, jewelry, Byzantine coins, glass and ceramic vessels, gaming pieces, tools, metal vessels, weapons, and fishing gear. Despite the wrecking process, most artifacts still defined the areas in which they were excavated according to initial survey reports (Bass et al. 2004:275-399).

Using artifact distribution reports, Bass and van Doorninck concluded that three living areas existed on the Serçe Limani ship—a small bow compartment, the open deck amidships, and a substantially larger stern compartment. Bass and van Doorninck established distinctions and generalizations across the collection by studying artifact forms. The variation in personal effects and food waste found within each living area suggest that social hierarchy existed aboard the eleventh century vessel (Bass et al. 2004:266-271).

The bow compartment contained glazed bowls, glass vessels, coins, a personal grooming kit, and the bones of sheep and/or goats and pigs, suggesting a single middle to upper class individual, probably a merchant. The amidships living area contained more humble finds, including ceramic, instead of glass, vessels, a backgammon piece, and exclusively sheep or goat bones. These findings correspond to the practice of having lower status crew and passengers live amidships, conceivably on the open deck. The stern compartment contained the majority of personal possessions found and probably served as the living space for the high-class crewmembers and merchants. The former occupants statuses are evident by the presence of fine jewelry, four Byzantine lead seals, eight chess pieces, a majority of the vessel's weapons, intact glass vessels, balance pans and weights, and superior food waste—most pork bones and all the fish bones found aboard (Bass et al. 2004:266-271).

In the 1980s, Sheli Smith researched the artifact assemblage of the Revolutionary War privateer *Defence*, located in Stockton Harbor, Maine. *Defence* of 1779, like *Vasa*, sank on its maiden voyage. Smith sought to understand "the effects of closing off a smaller shipboard community for long periods of time from its land based culture" (Smith 1986:12-13). No human remains were found aboard *Defence*. Instead, Smith interpreted ship life from artifacts dispersed across the sea bottom—items left behind. She employed several classes of personal belongings in characterizing the men aboard and defining their daily activities. These included: apparel, shoes, pipes, medicine jars, wine bottles, tools, ordnance items, and tableware (Smith 1986:12-13).

To better understand the economics of privateering and accessibility of commodities during the American Revolution, Smith considered the artifacts' origins or places of manufacture. Then, she used the objects' locations and conditions to reconstruct the interior layout of the brigantine—the spatial organization of the shipboard community. On a more individual level, Smith considered which physiological traits and behavioral traits, concerning self-perception and status, each artifact type signified. By utilizing the archaeological record in combination with historical documents, Smith developed a more accurate description of eighteenth century life at sea (Smith 1986:12-13; 209-215).

In 1994, Gail Erwin completed a project similar to Smith's 1986 research. Erwin studied the personal possessions from the eighteenth century sloop of war H.M.S. *Boscawen*. Constructed in 1759 for the French and Indian War, *Boscawen* was stripped of its armamens and rigging and left to rot at its mooring in 1767. In an effort to determine the ship's organization and the crew's routine and lifestyle, Erwin analyzed remnants of the crew's attire, diet, and recreation (Erwin 1994:1-3,41).

Dress items found on *Boscawen* included buttons, shoes, buckles, and pins; they were concentrated in the ship's living quarters. Other items of daily life included tableware, medicine bottles, hygiene products, gaming pieces, pipes, a Jew's harp, and coins. To establish distinctions and generalizations across the collection, Erwin studied the artifacts' styles and construction—their forms. She suggested that variety in style, artisanship, or material may be an indication of social status or class. For instance, the buttons displayed differentiation in type. Excavators discovered the more expensive fasteners, the sleeve links, and the wooden backs for covered buttons in the vessel's stern section, the traditional location of the officers' quarters. Alternatively, 75 percent of the homemade leather buttons were found in the bow and amidships where the general crew was housed (Erwin 1994:91,108-112,120-139).

In 1686, the French ship *La Belle* grounded at the southern end of Matagorda Bay, Texas. While the crew attempted to recover some cargo, a majority became entombed in the muddy bottom. Following the vessel's discovery in 1995, a combination of Historical Commission archaeologists and historians excavated the vessel inside a cofferdam. Aboard the vessel, excavators discovered a "kit" for building a colony (Bruseth and Turner 2005:3-6,55-57,82).

In addition to analyzing the items explorers brought to the new world, excavators typified the French crew with the personal possessions found aboard. The crewmember's religiosity was revealed through the presence of a wooden and cast brass crucifix and 43 wood and bone rosary beads. The discovery of 24 clay pipe fragments and nine gaming pieces suggests that the crew smoked and played backgammon and chess during their leisure time. Remnants of the crew's daily attire were also uncovered. Clothing remains included nine leather shoes, 24 pewter buttons, 329 wooden buttons, a red silk fragment, a clothing fragment with sewn buttonholes, 15 buckles, and two brass rings (Bruseth and Turner 2005:105-108).

Excavators also recovered one nearly complete skeleton underneath a wooden bunk in the lower bow section. Archaeologists used several personal possessions found near the skeleton to generate interpretations about the individual. The sailor was wearing a knit sweater and leather shoes at his time of death. He carried a leather wallet containing two combs—one for hair and one for lice. Nearby, excavators discovered a small pewter cup, or wine taster, for drinking liquids and a small water cask. The cup was stamped with the owner's name, C. Barange. Historical records and archaeological evidence suggest that Mr. Barange, like many others aboard, died of thirst before the ship sank (Bruseth and Turner 2005:117-118).

From 1992 to 2000, German archaeologists surveyed, excavated, and recorded a small seventeenth-century Danish frigate, *Mynden*, off the island of Rügen in Mecklenburg-Vorpommern. Jens Auer subsequently wrote a masters thesis on the site. While serving as an escort to a convoy of merchantmen in November 1718, *Mynden* hit an underwater obstruction and sank in ten feet of water. The men abandoned ship, leaving their belongings behind. All that presently remains *in situ* is a 15-meter long and 15-meter wide lower hull section, surrounded by artifact scatter. Despite the vessel's poor preservation, Auer was able to make conclusions about the frigate's crew using the personal artifacts found among the remains. For instance, although no complete clothing was recovered, the presence of several buttons of varying material and design and a variety of brass belt and shoe buckles confirm that the sailors wore individualized clothing instead of standardized uniforms (Auer 2004:264-276).

More recent and on-going studies on shipboard life, in reference to personal possessions, have been conducted on Henry VIII's *Mary Rose* and the Swedish warship *Kronan*. Like *Vasa*, *Mary Rose* has human remains, including 92 nearly complete skeletons. Archaeologists attempted to make associations between clothing and human remains, but it was not a straightforward process. The sinking, the ship's decay, the bodies' decomposition and movement, the breakdown of fasteners, and the decomposition of certain apparel often prevented association (Forster *et al.* 2005:21). The Solent was less conducive to preservation than the Baltic Sea. Leather jerkins (18 total) found covering the upper body and shoes (54 total) on feet remain the exception in identifying absolute association. Five jerkins were associated with wool textiles. Otherwise, little other clothing worn by the mariners survived. Besides preservation, the other factor in preventing association was grouping. Some areas had multiple bodies. It is reasonable to assume one individual was wearing the clothing, but it is impossible to determine which one (Forster et al. 2005:23).

In addition to associating clothing with human remains, archaeologists endeavored to associate personal effects with clothing. Five combs (two in leather cases), two leather pouches, and numerous coins and tokens were found associated with jerkins. Archaeologists also suggest that men wearing the jerkins probably used the weapons found in close proximity to jerkin fragments, but it is impossible to know for sure.

A more definite association can be made between clothes and items in chests (Forster et al. 2005:25-26). In 1990, Maggie Richards considered the assemblages of ten complete chests. Personal chests contained apparel, knives, knife sheaths, leather pouches, tableware, leather book covers, coinage, jewelry, weapons, tools, personal hygiene materials, and dice. Considering the form and function of each artifact within each chest, Richards identified the probable owner's occupation (Richards 1997:94-96).

The Swedish royal ship *Kronan* sank off Öland on June 1, 1676. While *Vasa* is the product of the early stages of Sweden's age of greatness, *Kronan* comes from the middle phase. Unlike *Vasa*, *Kronan* is the subject of a continuous underwater archaeological excavation. Thus far, 22,000 objects and 200-300 individuals have been recovered from the wreck (Einarsson 1997:209-212).

In 1997, Lars Einarsson published a preliminary report on several personal artifacts from *Kronan* that discussed the different ways personal possessions can indicate rank or social status (Einarsson 1997:212). He considered three ways of determining rank from an artifact. Rank or social status can first be determined by studying the artifact's style and construction. Erwin, Smith, and others employed this technique in their research. Examining the artifact's social history, or analyzing documentary records, can also help archaeologists recognize social status. For instance, using a letter addressed to the Admiralty in 1679, Einarsson determined the types of material culture that might belong to a captain of the Swedish Navy. First Captain Olof Olofsson Nortman's widow wrote the letter, which listed valuables taken aboard by Nortman—a member of Sweden's lower aristocracy (Einarsson 1997:212-214).

Another way to determine variations in social status across a wreck is to directly link artifacts to a specific person who served aboard. For example, Einarsson positively identified several pewter plates, a gold drinking spoon, 255 gold coins, navigational instruments, and a gold ring as belonging to General Admiral *pro tempore* Baron Lorentz Cruetz. Cruetz, who perished aboard *Kronan*, was a member of the highest class in Swedish society during the late seventeenth-century and was one of the most powerful men in Sweden (Einarsson 1997:214-216).

In 2004, Matthew P. Brenckle studied personal possessions in a very different fashion. Brenckle completed an all-inclusive analysis of Anglo-American sailor's clothing between 1750 and 1815. His thesis consisted of three parts. First, he considered sailor dress within the larger framework of costume history. A sailor's clothes were first and foremost utilitarian. A sailor had to attend to the decks and rigging at all hours in all types of weather, so they had to dress accordingly. Similar to all forms of dress within every century, eighteenth and nineteenth century Anglo-American sailor's apparel was also a form of non-verbal communication. The woolen jackets and wide-legged trousers or petticoat breeches revealed the sailor's wealth and cultural values. Contemporary accounts often made note of the sailors' outlandish, shore-going clothing in combination with their unruly behavior (Brenckle 2004:4-5,37-42).

The second component of Brenckle's research involved an in-depth study of the pictorial and documentary evidence of the mid-eighteenth to early nineteenth century Anglo-American seaman. He considered hats, jackets, waistcoats, trousers, stockings, handkerchiefs, shoes, shirts, buttons, buckles, foul weather gear, battle dress, and dress for special occasion separately. While he did not consider the representations as true to life, he postulated that the historical depictions provided insight into a consumer society and its contemporary, popular attitudes concerning seamen. Moreover, in some cases, the pictures provided accurate depictions of lower-class clothing that did not survive into modern times (Brenckle 2004:4,12-15).

As the final component of his analysis, Brenckle studied over 70 examples of clothing from a late eighteenth century English collier, *General Carleton of Whitby*. Brenckle observed and recorded each artifact recovered from the vessel. All were found in the ship's stern section. The goal was to understand clothing particulars—cutting, tailoring, sewing, construction, material, and repair. These details provided information concerning the past economy, trade patterns, and daily usage. When possible, Brenckle drafted a pattern for each artifact (Brenckle 2004:4,122-127).

The preceding archaeological studies show a variety of ways to approach material culture from shipwrecks. Regardless of the approach, the artifacts and their archaeological context provide archaeologists with a rare opportunity to understand shipboard communities of historic times. Some researchers were able to discern more than others, however. A few failed to go beyond identifying which items were personal belongings, the quality of those belongings, and what that quality might suggest about the overall crew. Meanwhile, the *Mynden* researchers only confirmed what was already known, uniforms did not appear until after the ship wrecked. Though knowing the types of personal belongings that are on board, the quality of those artifacts, and whether the clothes represent uniforms could be helpful in interpreting shipboard life, a lot more can be gained from understanding the specific context of use for the various personal items. For instance, there is more archaeological significance in identifying particular individuals that have high quality materials and may be well off and how they were employing those materials, as opposed to saying some of the crewmember had high quality materials.

Hence, some of the above methods of research were more useful than other when developing a methodology for this project. The techniques researchers used to examine and interpret the belongings of Mr. Barange on the *La Belle*, for instance, are very useful. The following thesis will take their method of understanding the associations between people and artifacts a step further, examining nine distinct contexts and comparing those contexts. Brenckle's placement of seamen's attire from one ship within the larger framework of shipboard society is also a useful technique. The following thesis will not only examine *Vasa*'s associated materials within the larger framework of Swedish shipboard society but also with the context of general Swedish society and European maritime society. Thus, this study adopted several methodologies and ideas from these earlier research projects, but it also introduced new ways of approaching personal possessions.

A METHODOLOGY FOR EXAMINING VASA*'S MATERIAL CULTURE*

All archaeological research projects, whether terrestrial or maritime, require a generic framework of action, a defined methodology. Only through a refined approach can a researcher clearly resolve a set of proposed research questions. This research loosely followed E. M. Fleming's proposed model of artifact study, which considers the history, material, construction, design, and function of an artifact and requires its identification, cultural analysis, evaluation, and interpretation (Fleming 1999:165-166).

After determining which artifacts were associated with human remains, investigation of personal items found aboard *Vasa* required five research stages, three stages of data collection and two interpretative stages. The first two stages of data collection involved classifying artifacts found in association with skeletal remains and determining the historical context and utilization of those artifacts. Then, by evaluating the distribution of various artifact types, a generalized inventory of what the mariners wore and had on their person aboard *Vasa* was conceived. Within the interpretation phase of this research, the generalized components of a mariner's attire and belongings were compared to the clothing and personal possessions of seventeenth-century Swedish nobility and peasantry and other seventeenth-century European sailors. The artifacts' forms and overall distribution were then compared to identify individuals as potential officers.

RECOGNIZING THE ASSOCIATED ARTIFACTS

The artifact is not the focus of archaeological study. Instead, the focus is on the creator and consumer. Consequently, the artifact's physical or archaeological context, its local within a social place, is where meaning is derived (Wright 1993:245). For a metal pot with no physical context, the only information that can be obtained is construction and decoration details. Alternatively, a metal pot located in the ship's galley provides information concerning the process of cooking and serving the crew's food.

In this study, personal objects found in close proximity to a skeleton are treated as objects that the individual had on his or her person at the time of sinking. The person is thus considered a consumer of the item. Information concerning the individual's social practices can thus be derived from the object. If the skeleton is definitively linked to a seventeenth-century Swedish ship, the artifact can also be employed in characterizing seventeenth-century Swedish sailors.

The primary source for this thesis was an online database called Statens Maritima Museers Kulturhistoriska Database (Marketstore), which details all artifacts found on board *Vasa*. The database currently contains 31,000 entries, representing more than 40,000 individual finds (Fred Hocker 2010, pers. comm.). This database permits the user to search for finds by location, object type, and artifact number, among other aspects. To locate the associated belongings of individuals who died on board, areas surrounding the known location of the fifteen skeletal remains were considered. As an example, to identify the personal property of David, whose remains were found on the starboard side of the upper gundeck, 2490-2720 cm from the inner face of the stem, all artifacts found between and under beams fourteen and fifteen on the starboard side of the upper gundeck were investigated.

When employing Marketstore to search for objects by location, the database presented every object found within the selected area, no matter the object's size or utilization. Therefore, a process for eliminating incongruous objects was created. First, all objects that could not theoretically be carried on an individual for extensive periods because of size or weight, such as anchors, barrels, furniture, and cannon, were excluded. Next, objects discovered inside another object, like a chest or a barrel, were extracted. All artifacts that were part of the ship's original construction, including knees, frames, cleats, and sculptures, were then eliminated. Finally, by considering each artifact's general utilization, the material culture that, in all probability, would have not been in the possession of a crewmember at the time of sinking were discarded, including animal bones, plates, pots, bowls, and frying pans.

The remaining data was inserted into a preliminary spreadsheet with reference to its supposed owner. Each entry included relevant information concerning the object—find number, category, type of object, material, date discovered, location aboard, reason for association, the object's maximum dimensions, special features, and current location. Object categories included money, tableware, clothing, clothing decorations, personal items, tools, and weaponry.

There were three possible reasons for association to a specific individual. If the original excavator linked the object to the individual during excavation, specific details, such as "found with David," were inserted into the spreadsheet. Objects that the museum staff subsequently linked to an individual were listed as "same area." All other objects were listed as "same general location." Artifacts in the latter category required additional scrutiny before being definitively linked to an individual.

Instead of identifying the exact location of artifacts aboard *Vasa*, the original excavators provided a large, general lot and locus. For example, the location of artifact number 07642, a spoon, was recorded as starboard side, upper gundeck, between beams 14 and 15. That location description covers an area that is about 2.3 m long and 5.85 m wide or 13.46 m^2. The spoon is only 57 mm long. Determining the exact archaeological contexts of artifacts listed as "same general location" on the spreadsheet thus proved difficult.

Two approaches were taken to overcome the problem. During excavation, as suggested in chapter one, archaeologists numbered finds in sequential order. Consequently, artifacts found in close proximity to each other have sequential find numbers. The materials that excavators definitively linked to Ylva, for example, were W 23068, W 23069, W 23070, and W 23071. With the knowledge that the sailors and their personal items would have been clustered together archaeologically, large collections of finds, with find numbers in sequential order, were included among a sailor's personal possessions, particularly if the find numbers could subsequently be linked with the find numbers of a sailor's skeletal remains.

The final step in determining whether an artifact was the possession of an individual involved the recorded location of each individual's bones. In most cases, the body's original orientation could be determined. Based on the locations of the individual's bones, duplicate items could be eliminated. For instance, if two pairs of shoes were found in the same general area as a skeleton, the pair found closest to the feet was included amongst the sailor's possessions. In several cases, two or three identical items are linked to a single individual, and there is no way of discerning if one or all belonged to the deceased person. While it is unlikely an individual was carrying two items that were the same, such as two pairs of gloves, it can be presumed that he was probably carrying at least one of them. In such cases, both items were included in this research.

Three seamen found outside the vessel—Rudolf, Sigurd, and Tore—had no associated personal belongings. After 333 years underwater, each skeleton consisted of only a few bones. These three skeletons, in addition to Ylva, were not protected by the mud and silt that built up inside the ship. Their personal items likely decayed or shifted away over time. Rudolf, Sigurd, and Tore, therefore, cannot contribute to general interpretations about the Swedish sailors' personal belongings and attire. In addition to Rudolf, Sigurd, and Tore, Gustav was eliminated from the final interpretative phase. Gustav's skeletal remains were found amidst a number of personal belongings, including six spoons, six shoes, five tools, and 81 coins. During the wrecking process, some large barrels full of personal belongings fell over and gradually decayed around Gustav. The barrels' contents and Gustav's remains became intermixed. Upon close examination, no single item could be definitively linked to Gustav, especially given the lack of contextual photographs.

IDENTIFICATION OF ARTIFACTS

All studies of material culture should begin with the question, what is it? To address the question, this archaeological investigation included a visual examination of the associated artifacts. The database included brief descriptions of the materials, but a more detailed analysis proved beneficial in defining their utilization, incidence, significance, and historical placement. Moreover, a significant number of objects were not properly identified during the excavation, so individual examination was essential. During visual examination, each object was removed from storage, recorded, and photographed. Some leather, cloth, and wooden artifacts could not be accurately measured or photographed because of their fragile condition. Records included construction details, design features, metric measurements, traces of wear, and material. In the case of several textile fragments, the original researchers had not determined which type of garment the fragment originally belonged to. After a visual examination of the fragment's material and construction, however, most fragments were categorized by garment type.

CULTURAL ANALYSIS

Artifacts do not just appear; there are fundamental reasons for every object's existence in a culture. Construction details and design features of artifacts result from either tradition, prevailing attitudes, customs, beliefs, or nonconformist ideas (Prown 1999:3). To fully understand an artifact, its historical context—its political, social, cultural, and economic setting—must be examined. One must know the beliefs and perceptions of the external environment, to understand the meaning ascribed to an object (Maquet 1999:30-40). As a component of this research, historical sources on the Swedish Navy, Sweden's political and economic structure, and seventeenth-century Swedish society were compiled and analyzed. Using these sources, the utilization, origin, and significance of the artifacts were identified.

Material culturalist Jessica Rawson proposes that "all objects have an ancestry," a lineage (Rawson 1993:70). When determining an artifact's role in society, an artifact's genealogy is just as important as its current appearance and function. The object's worth, form, style, decoration, structure, construction details, and purpose evolve across generations (Rawson 1993:69-70). By acknowledging changes, archaeologists can define the value a society placed on an artifact or a portion of an artifact.

This research included an analysis of the artifacts' histories via scholarly sources. These published sources were object specific. They included books about shoes, weapons, pipes, clothing, tableware, books, and money. The sources' primary geographical focus was Northern Europe, and they covered the late sixteenth and entire seventeenth centuries. In addition to written sources, similar archaeological finds from two Northern European shipwrecks, *Mary Rose* (1545) and *Kronan* (1676), were analyzed and compared to the *Vasa* materials. Findings from both sites are numerous and well documented.

GENERALIZATION

When comparing the materials found with each individual, this project requires generalization. According to E. H. Carr, "The historian is not really interested in the unique, but what is general in the unique" (Carr 1961:80). In reality, historians are concerned with the relationship between the unique and the general. A historian must consider why one man wore boots, while everyone else wore sandals. It is through generalization that historians learn from history. They employ generalizations to test evidence. The ideas learned or understood from one set of events or artifacts are applied to other events and artifacts (Carr 1961:82-83). For instance, if the historian is not sure whether seventeenth-century Swedish sailors all wore similar clothing, the historian can ask whether Swedish sailors from different periods and other seventeenth-century European sailors had similar styles of dress.

This research's generalizations allowed the researcher to identify the typical attire and property of seventeenth-century Swedish mariners and understand slight variations in dress. The typical sailor's attire was reconstructed from clothing artifacts found on various remains. No single skeleton had remnants of every component of the daily outfit, but each part was represented on at least two skeletons. At this stage of research, Beata's and Ylva's clothing and personal belongings were no longer considered. Since the two females probably boarded the ship as guests, their clothing and belongings are not representative of sailors or the daily operations of a floating community.

CHARACTERIZATION

The next components of this research, which were designed to answer research questions five, six, and seven, involved: (1) comparing the generalized, Swedish seamen outfit to local civilian dress, (2) examining and interpreting the differences between the *Vasa* sailors' clothes and belongings, and (3) evaluating the practices of Swedish seamen in reference to other seamen outside of Northern Europe. Before making these various comparisons, *Vasa* sailors were individually characterized based on their location aboard *Vasa* and their associated clothing garments, personal belongings, and utilitarian items. The latter analysis focused on the style, design, utility, construction, material, quantity, and quality of the clothing garments, personal belongings, and utilitarian items. An underlying goal was to pinpoint differences between *Vasa* sailors, modifications of the generalized outfit.

Next, the generalized attire of a *Vasa* sailor was compared to the seventeenth-century clothing fashions of Swedish royals and peasants. Again, similarities in style, design, material, and construction were considered. In addition to studying historical accounts and modern texts, this part of the research required analysis of contemporary artifacts and artwork. Seventeenth-century artifacts and artwork portraying sailors, noblemen, and peasants with visible garments and personal belongings were analyzed and compared to the *Vasa* artifacts. Stockholm and its surrounding area have more than 70 museums. The materials from eight museums and one library contained most of the materials this research used for comparisons: Stockholm's Stadsmuseum, Marinmuseum, Sjöhistoriska Museet, Nordiska Museet, National Museet (2010), Skoklosters Slott, Kalmar Läns Museet, Sjöfartsmuseet Göteborg, and the National Library of Sweden.

Few images of early seventeenth-century Swedes exist. Those that do survive portray prominent citizens and monarchs. Swedish artists did not begin painting the lower classes until the late seventeenth and early eighteenth centuries. To make up for the absence of lower class Swedish examples, considering Sweden's close ties with other Scandinavian countries and the

Netherlands, this research required the analysis and interpretation of Dutch and Flemish genre paintings and portraits. Large collections are located in Sweden, England, the United States, Germany, and France.

When using paintings for comparative research, one must take into account that they are works of art, "objects of interpretation" (de Vries 1996:3). Artists have a tendency to exaggerate some features and ignore or eliminate others; they are not true to life. They are not expository prose. Some even have political or religious motivations. Despite these tendencies, artists also paint what they know; they tend to illustrate everyday ideas, attitudes, objects, and clothes without a second thought (Brenckle 2004:11-12; de Vries 1996:3; Schwartz 1996:8-9). This is evident by the numerous seventeenth-century religious paintings that have seventeenth-century objects in the background. According to Brenckle, the painting's "illustrative value gives credence" (Brenckle 2004:14). As long as one is aware of the biases and historic contextualization, art can be employed in historic research (Brenckle 2004:36-37; de Vries 1996:3).

After comparing the generalized outfit to civilian dress, the differences between the seamen's clothing, personal belongings, and utilitarian items were evaluated. Possible explanations for modifications, or alterations, in the generalized outfit were explored. Strict hierarchies have existed on some ships since early times. One individual has sole authority over the ship. His officers support him, and they oversee the crew (Muckelroy 1978:221). This hierarchical structure may be evident in the archaeological record (Dellino-Musgrave 2006:135; White 2004, 2008). According to Dick Hebdige (1979:2), "the tensions between dominant and subordinate groups can be found reflected in the surfaces of subculture—in the styles of mundane objects which have a double meaning." In such a case, an item's style communicates group identity and/or group membership, as they relate to power and social differentiation (Beaudry *et al.* 1991:155-156; Roach-Higgins and Eicher 1995:13; Dellino-Musgrave 2006:135). Yet, researchers must be careful not to definitively equate the supremacy of artifacts with the supremacy of their owners or users and must consider the possibility of one artifact serving more than one symbolic function (Beaudry *et al*. 1991:156-157).

Thus, evidence of importation, rarity, experienced craftsmanship, and excess worth may indicate the presence of a well-off individual. People with means are generally associated with the higher social classes, and as previously stated, the commissioned officers of the Navy were generally from this class. Yet, commissioned officers were not the only seamen who belonged to the higher class. Non-commissioned and petty officers and common seamen could have just as easily have been well off, especially given the higher pay of officers and the methods of conscription. Some items, such as elaborate military swords (Draeseke 2009) and hunting rifles (Hamilton and Sandström 1982) can be more easily linked to officers.

The final phase of interpretation, involved comparing the practices of Swedish seamen, in terms of clothing choice and choice in personal possessions, to the practices of other seamen outside of Northern Europe. Analysis focused on countries in Western and Southern Europe, including Spain, England, the Netherlands, France, Germany, and Italy. These countries practices are evident from historical documents, records, accounts, and artwork.

CHAPTER 4: CLOTHING FIT FOR A SAILOR

"For the apparel oft proclaims the man"
(Shakespeare, *Hamlet* 1.3.72).

For thousands of years, humans have felt the need, or desire, to conceal their nudity. Practically every natural and manufactured material available has been employed as dress at some point. While the original function of dress is debatable, it undoubtedly evolved into one of the most powerful mediums of personal and social expression ever conceived. Clothing became a form of non-verbal communication—a visual statement of the individual and his/her society (Storm 1987:viii-ix, 3, 29). Archaeologists have much to gain from a close examination of historical clothing, for each garment is an assertion of its wearer's power, wealth, occupation, beliefs, values, and identity.

This chapter considers the clothing fragments found in association with *Vasa*'s human remains, in reference to seventeenth-century clothing trends. It begins with an introduction to the functions of dress. Then, it discusses textile trends of seventeenth-century Sweden and compares these trends to the textiles found aboard the *Vasa*. Next, clothing fashions are analyzed. Considering the lack of historical evidence regarding the clothing of early seventeenth-century Swedish sailors, the fashions of the Swedish nobility and peasantry are examined. After considering the period's popular attire, clothing is divided into ten categories: jackets, breeches, fasteners, underwear, stockings, adornments, straps, headwear, footwear, and handwear. Following general descriptions of each type of garment, this chapter includes archaeological catalogs of each textile fragment found in association with *Vasa*'s human remains.

FUNCTIONS OF DRESS

Clothing serves three intrinsic functions: utility, adornment, and modesty. Utility is a primary function of dress in most cultures. People wear clothes to enhance the performance of special tasks. There are two major types of physically enabling dress, dress employed as protection and dress designed for portage. As a conscious response to the environment, societies developed clothes that protected them from the physical dangers of climate, animals, and vegetation and terrain. Wearing protective clothing permitted them to work in all conditions. Meanwhile, to free their hands for additional tasks, they developed clothing that could carry goods and tools. For instance, the girdle, the precursor of the belt, was originally designed not to hold up clothes but to carry tools (Storm 1987:58-63).

Adornment is a universal motive for dress. It is a social concept because its success depends on the clothes being seen by others. Historically, people enhanced their appearance to increase their sense of belonging and to increase their self-confidence. The wearer's utmost desire was to receive a positive reaction from others. The label “attractive” was a cultural ideal. A person was labeled as better looking not because his or her outfit was more flattering but because it fit the cultural norms. To dress attractively, one had to be socially aware (Storm 1987:2-7).

The concept of modesty first developed because of habitual dress. Over time, some people began impulsively wearing clothing and felt psychological discomfort, fear, or anxiety when the customary practice was unfulfilled. Continuous exposure to dress resulted in the development of certain standards of propriety throughout these societies; clothing became a social norm. Modesty is, therefore, not an inherent human need but a cultured response. As a cultural concept, modesty in clothing varies across cultures and is dependent on place, activity, era, and individuals present. There are still several cultures that do not wear clothing at all (Storm 1987:83-96).

As societies with roles and statuses developed, communication emerged as a function of dress. The clothes one wears make a statement. Of course, this does not imply that clothes literally speak. They do, however, convey information about their wearer. Pulitzer Prize-winning novelist and academic Alison Lurie suggests that, similar to speech, the language of dress possesses a distinctive vocabulary and grammar. Clothes equate with words and can be combined to form outfits, which correspond to sentences. In this manner, a destitute peasant, who owned few clothes was limited in expressing concepts, while a wealthy nobleman with a large wardrobe could express a wide range of ideas (Lurie 1992:4-5). Each time a person puts on a pair of clothes, he or she , consciously or unconsciously, sends a message to society.

Garments do not already possess a meaning upon creation. They gain a set of meanings based on "numerous interpretations by numerous cultural producers" (Barnard 2002:33). In other words, the designer, wearer, and observer apply their own cultural experiences and expectations to interpreting a garment (Barnard 2002:33). The combined interpretations generate meaning, a statement about the wearer. These meanings can be derived from an entire item or a component of an item (Storm 1987:103). Assertions are, therefore, made at first judgment of one's apparel.

What does dress communicate about the wearer? Penny Storm suggests that "dress differentiates us from others while concomitantly asserting our social integration" (Storm 1987:105). Since social reality dictates what people wear, dress has the power to define personal identities, economic statuses, social roles, group affiliations, and the norms to which people are held accountable. Commonality in dress affirms similar values, beliefs, behaviors, influences, and wealth (Joseph 1986:42-50). A prisoner, wearing an orange jumpsuit, will never be mistaken for a police officer, just as a woman in rags will never be mistaken for a queen.

An examination of sailor's clothing may thus provide insights into both the daily operations of a floating community and the character of historic seamen. Despite the value of studying clothing, archaeologists have rarely examined seamen's dress from the sixteenth and seventeenth centuries. The reason for this lack of investigation is the lack of surviving examples. The few surviving garments are located in widely scattered collections in Europe and North America (Aneer 2008:100-101).

Unlike other artifacts, utilitarian outfits are rarely saved as mementoes. Those that were preserved are linked to famous people and events, primarily members of the upper class or royalty. The Royal Armory in Sweden, for example, maintains an extensive collection of sixteenth, seventeenth, and eighteenth century royal garments, and Uppsala Cathedral contains the costumes of three Swedish nobles executed for treason in 1567. Only smaller or singular pieces of dress from the lower levels of society exist because the more destitute people wore out their garments or reused them in new forms of clothing and interior decoration. The few existing examples of Renaissance and Baroque, lower-class clothing are primarily found on sunken shipwrecks and in historic buildings (Aneer 2008:102-103).

SWEDISH TEXTILES

During the early seventeenth century, prior to the Industrial Revolution and the appearance of machine-made clothing, accessibility to textiles and garments was limited. They were among a person's most valuable possessions. Individuals from the poorer, lower classes often owned only a single outfit. For instance, only 28 of the 278 people arrested in and around

Paris, France in 1780 possessed more than one outfit (Crane 2000:3). Even those individuals that were rich enough to own sizable wardrobes placed high value on their clothes, as they willed outfits to relatives and servants upon death and used cloth as a form of currency—a form of payment for services (Crane 2000:3).

The availability and value of cloth also varied by type. Thus, the seventeenth-century European upper class, including the Swedish, could obtain and wear silk and metal lace, satin, and velvet garments. Alternatively, the middle and lower classes were typically limited to clothes constructed from wool and linen. Those that could afford it also wore leather outerwear (Cosgrave 2000:154). Leather garments were unpopular in Sweden, however.

In Sweden, large-scale garment production and glove making did not really appear until the mid-seventeenth century (Looström and Stapf 1983:12). During the early seventeenth century, the lower classes produced their own clothing. Only the wealthy could afford a professional tailor (Tortora and Eubank 2005:204). Woolen fabric produced at home gained the name homespun or frieze. It was a coarse, typically plain-woven cloth with a nap on one side. Purchased, mass-produced woolen cloth was called broadcloth. Broadcloth was a fine, dyed cloth, woven in plain or twill weave. Sweden typically imported broadcloth from other countries, such as England, Germany, and Holland, where it was cheaply produced. In 1613, 17.4 percent of Swedish cloth was imported from abroad. By 1637, this percentage increased to 24 percent, only to fall significantly as Swedish factories developed in the 1640s. The nobility and bourgeoisie were the primary consumers of broadcloth (Looström and Stapf 1983:12-13,39).

The only dyeing that occurred in Sweden was on a small scale within the domestic environment. Swedes, therefore, had to look elsewhere for dyed garments. Customs documents from the sixteenth and seventeenth centuries indicate a large-scale importation of dyed fabrics.

People used madder (*rubia tinctorum*) to get red, woad (*isatis tinctoria*) to get blue, and weld (*reseda luteola*) to get yellow (Looström and Stapf 1983:12). These colors make up the primary color trio; they can be combined to form an array of other colors, including purple, green, brown, and black.

VASA *TEXTILES*

According to a 1983 study conducted by two Swedish researchers, Anne Looström and Birgitta Stapf, two categories of fiber were found aboard *Vasa*—animal and vegetable. Animal fibers are relatively resistant to decay, so approximately 96 percent of the fibers found aboard *Vasa* were either sheep wool or silk. Wool found aboard *Vasa* is similar to Medieval Swedish wool; it is coarser than Viking wool. While elsewhere in the early seventeenth-century coarser wool was employed in the warp and finer wool in the weft, *Vasa*'s wool shows no variation between warp and weft (Looström and Stapf 1983:9-10).

Only three percent of the textiles from *Vasa* are constructed of vegetable fibers. Flax (*linum usitatissimum*) was the most common vegetable fiber employed during the seventeenth century (Looström and Stapf 1983:10). The only preserved flax fragments aboard *Vasa*, however, are traces of linen thread in the stitching holes and hems of woolen garments and the flax weft of the lighter sails. Researchers also found 24 pieces of silk—6 percent of the total quantity of animal fiber (Looström and Stapf 1983:9-10).

A majority of the wool found on *Vasa* is drab and brown or black, which suggests the use of naturally colored yarn from different breeds of sheep. Few of *Vasa*'s wools have signs of dyeing. It is clear, despite fading, that there were brownish-red, blue, and yellow garments aboard. The minimal traces of pigment in *Vasa*'s colored wools suggest that dyers employed white wool for dyeing. All dyed fabrics are broadcloth (Looström and Stapf 1983:12-14).

EUROPEAN FASHION AND SWEDEN

The heyday of the stiff and sober elegance of Spanish and Italian fashion ended as the seventeenth century began. Instead, the French set the tone of fashion across Europe. French fashion bore the imprint of courtly culture. In design, it reflected the Baroque artistic movement. Lines were softened but retained some rigidity, and shapes became artificial and painterly (Rangström 2002:309). The costume silhouette displayed a natural elegance, and the Renaissance desire for excess decoration faded. Just as the elaborate decorations died away, slashes, panes, and padded sleeves gradually disappeared. The natural beauty of textiles was, once again, appreciated, and the thought of comfort rose to the foreground (Cosgrave 2000:148-149,154).

While the French influenced the wardrobes of most Europeans, Dutch-German fashion only influenced Protestant countries, such as Sweden. Dutch-German fashion, similar to Dutch art, emphasized moderation and reflected middle-class (bourgeois) and urban culture (Rangström 2002:309). This stark style eventually became the "uniform" of the bourgeoisie all over Europe and persisted until the nineteenth century (Entwistle 2000:97). Although the Spanish had long lost their position as mediators of fashion, Swedes continued to utilize components of Spanish dress until the 1640s (Rangström 2002:309).

The wardrobe of a fashionably dressed Swedish gentleman of the early seventeenth century included shirts of fine linen, drawers, doublets, sleeve stockings (lace collars and lace cuffs), knee breeches, silk stockings with wide garters tied in bows, embroidered gloves, and a soft, broad-brimmed hat with a hat band and plume. On their feet, the wealthy wore shoes with large rosettes or boots with decorated boot hose. For warmth, they wore a casaque or cloak and a small fur lined muff. Traditionally, Swedish gentlemen also donned a baldric and rapier (Rangström 2002:309).

Sovereign Gustav II Adolf and Field Marshall Herman Wrangel, an Estonian noble in Swedish service, each wore such an outfit in a portrait painted by Jakob Elbfas c. 1630 and a portrait painted by an unknown author c. 1630, respectively (Figure 3 and Figure 4). The basic design and form of the early seventeenth-century suit are also clearly illustrated by three historic examples from the Royal Armory—two suits worn by Gustav II Adolf during the Polish campaign of 1627 and the violet traveling costume Gustav II Adolf had made for his 1620 wedding (Figure 5 and Figure 6).

Due to its simplicity in design and form, the fashion could all be made using more widely available, inexpensive cloths. The Swedish peasantry immediately adopted the hip-length doublet, or jacket, and knee breeches as a traditional working suit. The outfit was such a success in the agricultural and industrial areas that it persisted into the Victorian Period (de Marly 1986:24-25). The traditional suit, constructed of less luxurious fabrics, is visible throughout Dutch landscape painter Esaias Van de Velde's 1618 painting "The Joy of the Ice on the Wallgraben" (Figure 7). The Swedish peasant in Figure 8 wears a black, hip-length jacket and wide knee breeches.

JACKETS

The origin of the jacket can be traced back to the first standard cloth garment, the shawl. The shawl was a piece of folded cloth, which the wearer wrapped around their entire body and

Figure 3. Jacob Elbfas, "Portrait of Gustav II Adolf," 1630, Skokloster Slott, Inv. No. 535.

Figure 4. Unknown Artist, "Portrait of Herman Wrangel," 1630, Skokloster Slott, Inv. No. 16047.

Figure 5. Two costumes worn by Gustav II Adolf during the Polish campaign of 1627, Royal Armory, Inv. No. 3369, 3372, 3375, 3849.

Figure 6. A violet traveling costume ordered for the wedding of Gustav II Adolf in 1620, Royal Armory, Inv. No. 3351.

Figure 7. Esaias Van de Velde, "The Joy of the Ice on the Wallgraben," 1618, Alte Pinakoteck, Munich, Germany © ARTOTHEK.

Figure 8. A Swedish peasant at rest, a detail from the Landt- och Siö Charta Öfver Siön Mälaren, 1689, Kungliga Biblioteket.

secured with a belt. Next came the tunic, characterized by the permanent joining of the shawl's edges. Both the Romans and Greeks wore tunics. As a result of weather, humans added extensions, or sleeves, to the tunic's sides. Thus, the frock or gown came into existence. By only joining the edges along half the garment's length, humans produced the vest or shirt. To achieve the appearance of a jacket, historic people left the center front open, or disconnected. The earliest form of a jacket dates to the Bronze Age. Archaeologists found the garment in an oak coffin in Denmark, amongst the apparel of a single woman (Webb 1907:15-19).

The main outer, upper garment of the early seventeenth century was the doublet or jacket. The two garments were interchangeable, as are the terms. They are only distinct in social reference. While the term doublet was predominantly associated with the upper class of Europe, the utilitarian term jacket was associated with the peasantry. The design and basic structure of the garments, however, remained the same. Jacket fashion was merely doublet fashion simplified. They were the predecessors of the late-seventeenth-century waistcoat (de Marly 1986:24-26; Cosgrave 2000:128,153-154). Since the majority of clothing recovered from *Vasa* is considered jacket quality, the term jacket is applied to their upper garments, just as the term doublet was used to describe the higher quality upper garments of Gustav II Adolf.

Two distinct styles of doublet existed before 1645. The garments differed in fit, cut, and skirt length. From 1590 to 1630, the doublet's body was close fitting, long waisted, and stiff. The doublet was fastened with a row of buttons from the top of the collar to the waist. Occasionally, men employed hooks and eyes, laces, or ribbons as fasteners instead of buttons. The waistline had eyelet holes all round, which men used to attach their knee breeches. Before 1610, the doublet skirt was made with approximately eight short square tabs that flared out over the knee breeches from a round waist. Post 1610, doublets had deeper skirt tabs that curved down to sharp, overlapping points. Along the neckline, the doublet had a high standing collar with hook and loop fasteners, which occasionally sloped to a V shape under the chin. Two types of sleeves were common, a plain and close-fitting sleeve with 12 buttons (or pins in the case of the poor) along the wrist's front seam or a full sleeve with 12 buttons down the wrist's back seam, which was paned, or slashed, from shoulder to elbow. If the sleeves were paned, then the breast of the doublet had four to six panes down its breast. Wings, projecting welts that encircled the sleeve insertion, or armhole, were popular until 1630. The garment often included embroidery and braid (lace) (Cunnington and Cunnington 1972:13-19). Gustav II Adolf's red broadcloth doublet is an example of style 1 (Figure 9).

Doublet style 2, which met success from around 1630 to 1645, was easy or loose fitting and high waisted. The waist was once again round, and the eyelet holes vanished. Instead, the men attached their knee breeches with hooks and eyes. The skirt tabs remained deep and sharply pointed until around 1635, at which point the sharp point disappeared. In addition, the number of tabs was reduced to six after 1635. The standing collar persisted, but decreased in height. Again, two types of sleeves were common. The first sleeve type was moderately loose fitting with either 12 buttons along the wrist's back seam or a turned back cuff at the elbow. The front seam of the first type of sleeve was often left open, creating a longitudinal slash. The second sleeve type was full and paned from shoulder to elbow and close fitting from elbow to wrist. The decorative wings decreased in size and were eventually discarded in the 1640s. While buttons continued to run from neck to waist, the lower buttons of doublet style 2 were often left undone in order to expose the beautiful undershirt. In addition, hooks and eyes increased in popularity. Style 2 had numerous decorative options, including pinking with braid, panes along the breast and back, braid along the outer edges, extensive embroidery, and broad ribbon points tied in bows or loops around the waistline (Cunnington and Cunnington 1972:20-22). Gustav II Adolf is wearing a style 2 doublet in a 1632 copper engraving of the sovereign on his deathbed (Figure 10).

Figure 9. Gustav II Adolf's red broadcloth doublet, Royal Armory, Inv. No. 3349.

Figure 10. Unknown Artist, Copper engraving of Gustav II Adolf on his *lit de parade*, December 1632, Kungliga Biblioteket.

Housewives typically sewed lower class jackets. They constructed jackets of handspun coarse wool. In general, peasants could not afford to dye any garments, so jackets remained somber and dark colored. The jacket's fit and the waistline mimicked the popular doublet of the period (de Marly1986:24-25). Thus, peasant men wore close-fitting, long-waisted jackets from 1590-1630, and loose-fitting, high-waisted jackets from around 1630 until 1645. While peasant jackets had skirts, they rarely had the sharp pointed decorative skirt tabs after 1620 (Looström and Stapf 1983:42). Considering the large array of Dutch genre paintings illustrating the period, it appears their jackets featured both the close fitting and loose sleeves. The lower class garments included woolen wings above the sleeve insertions and standing collars around the neckline. As previously suggested, the elaborate embroidery, lace, and ribbons were not a feature of lower class dress, and the garments were rarely paned or pinked. Woven jackets of varying colors are worn by the ice skaters in Esaias Van de Velde's painting (Figure 7).

The differences in lower class and aristocratic upper garments are evident in David Teniers the Younger's 1637 painting "”Peasant Merry-Making" (Figure 11). In the left foreground of the oil painting, there is a nobleman leading his wife through the party. He is wearing a doublet, similar to style 2, with pointed skirt tabs. Surrounding the couple are roughly 20 male villagers wearing woolen jackets.

ASSOCIATED JACKETS ABOARD **VASA**

W 03223e
Jacket Back Panel Fragment. Plate 1
Found: ÖB, SB, Beams 5-6, 1100 cm from forward
Associated with: Adam
Height: 52.5 cm
Width: 42.3 cm

Figure 11. David Teniers the Younger, "Peasants Merry-Making (Village Festival)," 1637, Museo del Prado, Madrid © Joseph S. Martin – ARTOTHEK.

This textile fragment was found in the same area as Adam's bones. It is associated with textile fragment W 08942, a segment of the jacket front. The plain-woven jacket fragment is made out of a drab, undyed, brown wool. The woven wool cloth is fulled, so the fabric is soft, thick, and fuzzy. The man in Jan Miense Molenaer's 1637 painting "The Five Senses: Smell" is wearing a similar undyed, brown, woolen jacket (Figure 12). The curved inset of the garment, where the sleeve head would have been attached, is visible, but the sleeve did not survive. From the armhole bottom, the garment tapers down toward the straight cut waist, so the cut edge is approximately 28 cm wide. The bottom edge is finished with a rolled hem. The back of the original jacket would have been a single piece of fabric.

W 03223b
Jacket Fragment. Plate 2
Found: ÖB, SB, Beams 5-6, 1100 cm from forward
Associated with: Adam
Length: 27.0 cm
Width: 11.0 cm

This nondescript jacket fragment was found in the same general location as Adam. The fragment is constructed out of plain-woven, brown, fulled wool. It was associated with W 03223e, a jacket back panel. The two fragments are likely from the same garment.

Figure 12. Jan Miense Molenaer, "The Five Senses: Smell," 1637, Mauritshuis, The Hague, The Netherlands, Inv. No. 575.

W 08942
Jacket Front Panel Fragment. Plate 3
Found: ÖB, SB, Beams 5-6, 1070-1220 cm from forward
Associated with: Adam
Height: 30.5 cm
Width: 14.8 cm

This undyed, brown, woolen jacket fragment was found near Adam's bones. It is likely from the same garment as textile fragment W 03223e, a jacket back panel. Similar to the rear fragment, this textile fragment is plain woven and fulled. The jacket was originally clasped together with brass hooks and eyes, as is evident from metal residue. Traces of linen thread on the inner edge of the front breast may represent stitching from the hooks and eyes. The opening is finished with a rolled hem.

W 03261
Jacket Sleeve. Plate 4
Found: ÖB, SB, Beams 5-6, 1100 cm from forward
Associated with: Beata
Length: 41 cm
Width at top: 20 cm
Width at bottom: 12.4 cm
Thickness: 0.4 cm

This brown, plain-woven wool fragment was found near Beata's bones. The sleeve bottom tapers toward the wrist and is fulled and undyed. The wrist edge is finished with a rolled hem. The ½ cm wide seam allowance of the original facing edge is visible on one length of the sleeve.

W 09323
Jacket or Breeches Fragment. Plate 5
Found: ÖB, BB, Beams 8-9, 1490-1630 cm from forward
Associated with: Cesar
Length: 30 cm
Width: 9.6 cm

Made of plain-woven, brown wool cloth, this small fragment is difficult to identify. It is probably a fragment of breeches or a jacket. It was found in the same general location as Cesar's bones. Surface fibers, which would have normally been eroded with use, are still visible, indicating that the garment was new or underused. The fulled wool garment has two finished edges with evidence of holes from sewing. The long straight edge of the fragment is selvage—the original fabric's finished edge.

W 07618
Blue-dyed Jacket Fragment. Plate 6
Found: ÖB, SB, Beams 14-15, 2490-2720 cm from forward
Associated with: David
Length: 28.5 cm
Width: 16.5 cm

This is a plain-woven, white wool, broadcloth jacket fragment. The finely woven white wool is dyed blue, suggesting it was imported. The cloth has a smooth knapped face. The jacket fragment was with the remains of David. The general shape is suggestive of a jacket front panel with a curved inset for the upper sleeve. Since there are no finished ends or seam allowances present on the fragment, it cannot be definitively identified. The man kissing a woman in the right foreground of Johannes Lingelbach's 1651 painting "Peasants Dancing" is wearing a blue-dyed woolen jacket that was probably similar to this one (Figure 13).

W 18414a, b
Two Jacket Fragments. No Plate Available
Found: TD, BB, Beams 16-17, 2819-2976 cm from forward
Associated with: Erik

Found in the same general location as Erik's ribs, these two jacket fragments are made of plain-woven wool. They appear to be the same fabric (outfit) as W 18415, a jacket sleeve. While the fabric is undyed, it is extremely dark, suggesting the wool came from a black sheep. Iron stains are apparent on fragment B, an indication that either an iron object decayed nearby or the garment had buttons with iron wires. The lack of finished edges makes it impossible to identify which part of the jacket these fragments represent.

Figure 13. Johannes Lingelbach, "Peasants Dancing," 1651 © The Metropolitan Museum of Art / Art Resource, NY.

W 18415
Jacket Sleeve. Plate 7
Found: TD, BB, Beams 16-17, 2819-2976 cm from forward
Associated with: Erik
Length: 32.5 cm
Width: 13.8 cm

This jacket fragment appears to have come from the same garment as W 18414a and W 18414b. It was found near Erik's ribs. The fragment is plain woven and undyed. Similar to 18414a and 18414b, the fragment is extremely dark, suggesting that the wool came from a black sheep. The jacket fragment represents the top of a sleeve. Two sides of the fragment are finished with a rolled hem. The two finished sides come together at a point. One side is 13.2 cm long, while the other is 17.5 cm long. The sewn holes, along with some linen thread pieces, are still visible along the finished edges. An original rectangular notch, 6.3 cm long by 2.6 cm wide, was cut out of the bottom for unknown reasons. Notches are normally added in order to make flattening the seam easier in concave areas. The garment presumably continued out from this fragment, forming a straight cut sleeve.

W 10144
Jacket Sleeve. Plate 8
Found: ÖB, SB, Beams 22-24, 3710-4000 cm from forward
Associated with: Filip
Length: 49.8 cm
Width: 21.8 cm

This textile fragment was found in connection with Filip's bones. It is associated with a silk band (W 10140) and 12 glass buttons (W 10272). The twill (three shaft) woven, coarse jacket fragment is made from undyed, brown wool. The sleeve appears to be straight cut. Portions of the upper and lower sleeve are present. In addition, 3 cm of the seam between the upper and lower sleeve is still intact. The seam was constructed via face stitching two pieces of fabric together and turning them out so that the seam was enclosed. Then, the seam allowance was trimmed back to ½ cm. This seam allowance is still visible along the sleeve edges that have come unstitched. The original linen thread is still present in the seam. The fragment ends in an unfinished straight cut. The other end is gradually fraying.

W 14292
Yellowish-brown Jacket. Plate 9
Found: UB, BB, Beams 13-14, 2197-2453 cm from forward
Associated with: Helge
Length (collar to waist): 42.5 cm
Width (waist): 21.5 cm

This particular find is the most complete textile fragment found in association with human remains aboard *Vasa*. The artifact consists of approximately half of a diagonal twill (4-shaft) woven jacket. The fulled jacket is constructed of the same colored fabric as W 14293, a pair of breeches. The two garments differ in weave, however. The jacket, breeches, and a pair of shoes were found on the skeletal remains of Helge. Helge was trapped beneath a gun carriage as the ship sank. He was positioned on his right side at the time of recovery. Therefore, only the right portion, the part beneath his remains, is preserved.

The jacket is yellowish-brown, suggesting that it is yellow-dyed, brown wool. The pieces are sewn together using an overcast stitch. Despite its fragmentary state, the jacket has one of the three complete sleeves found. All three sleeves are constructed with three pieces, a front, a back, and a gusset—a triangular piece of fabric inserted into a seam to add width. The top of Helge's 70.0 cm long sleeve is approximately 20.0 cm wide. The sleeve tapers towards the wrist. The other two complete sleeves are straight cut. The wrist of Helge's sleeve is 12.0 cm wide and has a rolled hem. One seam has come unstitched from the wrist to roughly the elbow. The sleeve has been repaired with a patch at the elbow. The patch was attached from the inside using an overcast stitch. The original collar and skirt are not present. A straight cut is visible along the jacket's left side, but the finished edge of the waist is not preserved. This piece appears to be the right, front panel with attached sleeve.

W 17664a, b, c
Three Jacket Skirt Fragments. Plate 10 and Plate 11
Found: HS, BB, Beams 6-7, 1137-1296 cm from forward
Associated with: Johan
Length A: 21.2 cm
Width A: 37.0 cm
Length B: 9.1 cm
Width B: 9.8 cm
Length C: 19.9 cm
Width C: 26.3 cm

Found adjacent to Johan, these three jacket fragments are high quality, blue-dyed broadcloth. The fine twill (3-shaft) woven jacket fragments are the remains of a jacket skirt. The skirt panels were originally cut in the shape of trapezoids. This shape would have created an overlapping flap along the jacket's center front and two sides. The man's jacket in the foreground of Jan Miense Molenaer's 1637 painting "The Five Senses: Hearing" has similar overlapping, trapezoidal skirt panels (Figure 14). Like this jacket, the jacket associated with Johan appears to be close fitting and long waisted with deeper skirt tabs. The base of the skirt appears to be the selvage, as illustrated by fragments A and C. Each fragment has a 1.0 cm wide seam allowance along its upper edge. This edge would have connected to the base of the jacket. Fragment C has visible linen thread along its upper edge, suggesting the entire garment was sewn together with linen thread. Fragment C also has a 2.0 cm wide extension along one side, which may represent either the front or rear flap. Fragment B is a small fragment without finished edges. It is likely a fragment from the center of a skirt panel.

W 11696
Jacket Fragment. No Plate Available
Found: HS, MS, Beams 12-13, 2075-2221 cm from forward
Associated with: Ludwig

This small, plain-woven, undyed wool fragment is difficult to identify because no edges are finished. The fragment was found in the same general location as Ludwig's skull, shoulder blades, spine, and fingers. Portions of Ludwig's skeleton and belongings may have fell through the lower gundeck and orlop hatches. The fragment's location and close resemblance to W 13819a, a jacket fragment, suggests that it is also from a jacket.

W 13819a
Jacket Front Panel Fragment. Plate 12
Found: HS, MS, Beams 12-13, 2075-2221 cm from forward
Associated with: Ludwig
Length: 11.0 cm

Width: 7.0 cm

Similar to W 11696, this jacket fragment is made from plain-woven, undyed wool. The dark colored fragment represents the bottom corner of either the left or right front jacket panel. The base edge is the selvage. One side is straight cut and has visible brown metal stains. The stains may represent iron hook and eyes or the iron wire of button eyes. The jacket panel was found close to a breeches fragment (W 13819c), a stocking fragment (W 13819b), and a decorative woven band (W 13819d). Archaeologists uncovered all four finds near the human remains of Ludwig.

Figure 14. Jan Miense Molenaer, "The Five Senses: Hearing," 1637, Mauritshuis, The Hague, The Netherlands, Inv. No. 574.

BREECHES

Breeches, similar to jackets, have their origins in the shawl, which people fastened with a belt. Some people separated the bottom of a shawl from the top, creating a kilt. Before breeches could come into existence, the idea of stitching along the garments edges, forming a tunic, had to occur. Then, upon separating the top of the tunic from the bottom, a skirt was born. By adding two parallel seams down the center, early people created pants or trousers. This allowed for easier and wider movement of the lower extremities. Breeches are merely trousers cut at the knee. Pants have their origins in antiquity. Though the elite civilization of the Romans did not wear the barbaric garment, the enemies of the Romans did, as illustrated by carvings on Trajan's Column (Webb 1907:72-78).

The early seventeenth century featured leg wear fashions that had evolved from the late sixteenth century. Five forms of breeches dominated the first half of the seventeenth century. Upper class and lower class knee breeches only differed in material and decoration; the shapes were congruent. During the seventeenth century, men did not use belts to keep their breeches from falling down. Rather they fastened their breeches directly to their jackets. Before 1630, men attached breeches to their doublets using points; from 1630 to 1650, they used metal hooks and eyes. The poorer citizens of Europe attached their breeches using makeshift fastenings and pins. Belts were used more for portage or decoration (Cunnington and Cunnington 1972:41-45,52).

From 1550 to 1620, men wore bulky trunk breeches or trunk hose. Trunk breeches sloped down and out from a tight waist forming a swollen mid-section. The legs then turned in abruptly, forming tightly fitted sections called canions, which stopped at the knee. Before 1595, breeches were sewn to thigh-length stockings, forming one item of clothing. Some trunk breeches were padded and stiffened into a rigid shape, while others were closely gathered at the waist. Points—tagged ties—or buttons sealed the waistband and front vent. Trunk hose were rare, especially amongst the lower classes, during the seventeenth century. They were usually a component of ceremonial dress (Cunnington and Cunnington 1972:41-45). Dutch portrait painter Steven van der Meulen painted King Erik XIV of Sweden wearing trunk breeches in 1561 (Figure 15).

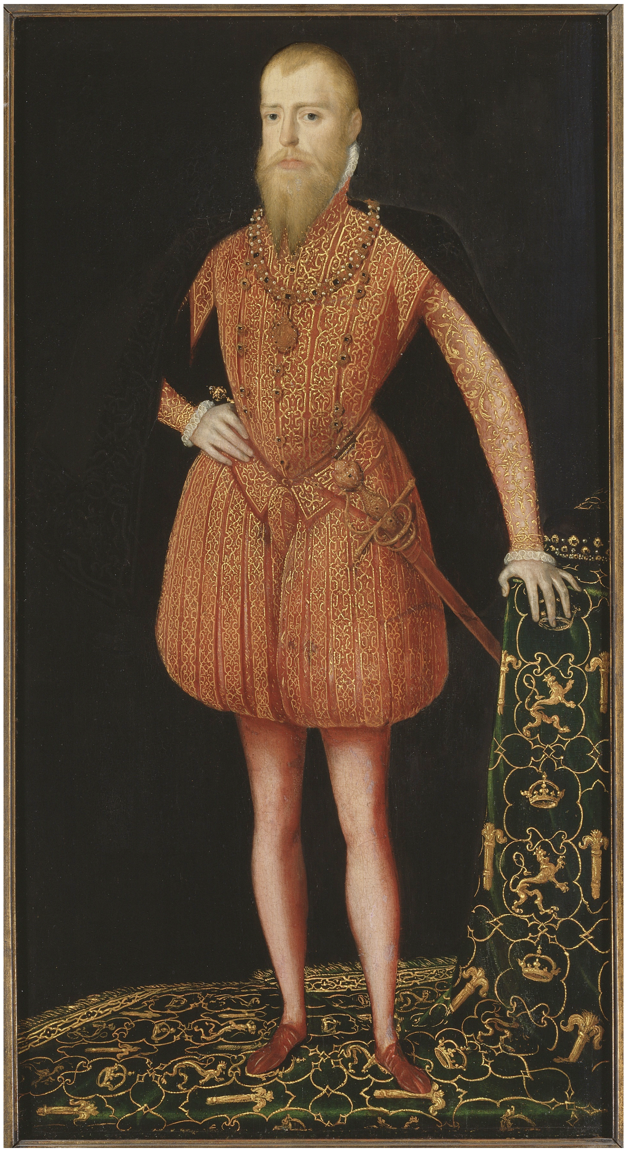


Figure 15. Steven Van der Meulen, "King Erik XIV of Sweden," 1561 © the Nationalmuseum, Stockholm, Sweden.

From 1570 to 1620, men wore Venetian or Galligaskin breeches. Venetian breeches fell to the knee. They had a wide, gathered waist that narrowed downwards to the knees, where they were either buttoned or tied. Men sometimes stuffed the Venetian breeches around the hips. Galligaskin breeches maintained the same general structure as Venetians, but they were closer fitting. Slops, very wide baggy knee breeches, maintained popularity throughout the early seventeenth century (Cunnington and Cunnington 1972:47).

'Cloak bag breeches' gained popularity in the 1620s. They were full oval breeches gathered at the waist and either gathered or shaped in above the knee. Wealthy noblemen typically encircled the knee with decorative points. Between 1628 and 1635, 'cloak bag breeches' were sometimes closed below the knee and fastened with a ribbon rosette or sash garters tied in large bows. Both classes often trimmed the outer seam. While the wealthy employed braid, embroidery, and rows of buttons, the poor used woven wool bands. All forms of breeches had short vertical slits from the waist down on each side, which provided access to internal pockets (Cunnington and Cunnington 1972:47-49).

David Teniers the Younger's "Peasants Merry-Making" illustrates Venetian, or Galligaskin, breeches and 'cloak bag breeches' (Figure 11). The man sitting on a barrel in the middle foreground and the three men dancing with their wives each have on Venetian, or Galligaskin, breeches. Meanwhile, the older man in the right foreground and the aristocrat are wearing 'cloak bag breeches.' Pieter Codde's "Young Scholar Smoking a Pipe in his Study" illustrates the 'cloak bag breeches' close-up (Figure 16). The two breeches worn by Gustav II Adolf during the Polish campaign of 1627 are also 'cloak bag breeches' (Figure 5).

Figure 16. Pieter Jacobs Codde, "Young Scholar Smoking a Pipe in his Study," ca. 1630-1633, Palais des Beaux Arts, Lille, France © Réunion des Musées Nationaux / Art Resource, NY.

ASSOCIATED BREECHES ABOARD VASA

W 14293
Yellowish-brown Breeches. Plate 9
Found: UB, BB, Beams 13-14, 2197-2453 cm from forward
Associated with: Helge
Length: 50.6 cm
Width: 41.2 cm

No complete breeches were found aboard *Vasa*. This find consists of one upper leg portion. The plain-woven, fulled woolen breeches, a jacket (W 14292) and a pair of shoes (W 14562 and W 14563) were found on the skeletal remains of Helge, beneath a gun carriage. The breeches are yellowish-brown, indicating they are yellow-dyed, brown wool. The breeches have 6.0 cm wide folds (pleats) at the waist, suggesting they were very wide. They have one side seam. The garment also has a 20.0 cm long opening along one side for a pocket (Looström and Stapf 1983:50). A knife (W 01437) and a knife sheath (W 14310) were found inside this pocket. The breeches would have been knee-length breeches that tapered at the end. The end was likely secured with a ribbon.

W 13819b, c
Knee-length Breeches. Plate 13
Found: HS, MS, Beams 12-13, 2067-2197 cm from forward
Associated with: Ludwig
Length: 70.0 cm
Width: 32.0 cm

This find number contains several remnants of a pair of knee-length breeches. Among these fragments is the only breeches fragment aboard *Vasa* that maintains its entire length and width. The plain-woven, grayish-brown wool fragment is either the front or back of a pair of breeches, which taper to a hemmed bottom. There are several fragments from the top of the breeches, which have 18 cm wide gatherings. This shows that the breeches had an excessively wide waist before pleating. The breeches would have had seams on both the leg's inseam and the outer seam (Looström and Stapf 1983:50).

The trouser fragments were found in the same area as Ludwig's remains. One fragment, labeled W 13819b, is still attached to the remains of a stocking. Compared to the stockings, the breeches are more tightly woven. The breeches fragments were also associated with W 13819a, a jacket fragment. Compared to the jacket, the breeches fragments are less tightly woven and made of lighter colored wool. A finely woven wool band, which would have run down the breeches' outer seam, was also found nearby.

FASTENERS

When humans began covering their bodies, some form of fastening was required. Button-like fasteners date back thousands of years; archaeologists have uncovered prehistoric examples in Northern Europe (Meredith and Meredith 2009:9). Twelfth century European sculptures provide the first evidence of buttons, but buttons are not mentioned in historical texts until the fourteenth century. The earliest archaeological examples, consisting of plain metal buttons, date to the late fourteenth century. By the sixteenth century, buttons were common functional fasteners for men. Seventeenth-century men did not merely use buttons as functional fasteners; they used buttons as primary adornments. In fact, buttons are the most common personal adornments found on historical period archaeological sites (White 2005:50).

Plain metal buttons are the most common archaeological examples because of their sturdiness. They were expensive before 1700, so people typically reused them repeatedly. During the seventeenth century, specialists produced buttons in small workshops near raw materials across Europe (Meredith and Meredith 2000:9). The value of each button depended on the appeal and availability of the material used. Only the wealthy could afford silver, gold, and glass buttons. The man's blue-dyed jacket in Jan Miense Molenaer's 1637 painting "The Five Senses: Sight" has fashionable metal buttons along its right breast (Figure 17).

Figure 17. Jan Miense Molenaer, "The Five Senses: Sight," 1637, Mauritshuis, The Hague, The Netherlands, Inv. No. 573.

Thread-covered buttons were popular during the sixteenth and seventeenth centuries. The thread-covered buttons had a flat, round wooden, bone, or wire core, which varied in shape. On *Mary Rose*, archaeologists found pear-shaped and simple round cores (Mikhaila and Malcolm-Davies 2006:19). Metal, hair, silk, or linen thread decorated the button's outside. Designers worked the buttons by hand, using plaiting and a needle, sometimes with complex and intricate designs. The buttons were not always functional. Occasionally the wealthy had thread-covered buttons sewn down the seams of their breeches as decoration (Hart and North 1998:112-115; Mikhaila and Malcolm- Davies 2006:19). Designers often covered the core with a single piece of cloth that matched the garment. These textile-covered buttons were considered poor imitations. Button makers exerted more time and effort to produce thread-covered buttons, so aristocratic classes preferred them. In England, Queen Anne banned cloth-covered buttons at a penalty of £5 per dozen (White 2005:50).

Another common (perhaps the most common) fastener of the sixteenth and seventeenth centuries was the hook and eye. The tailor of Queen Elizabeth I of England, for instance, ordered hooks and eyes by the pound. Hooks and eyes were typically either brass or steel and look identical to modern examples. (Mikhaila and Malcolm-Davies 2006:19). Hooks and eyes were likely popular amongst the peasant class because of their relatively low cost. People not only had to factor in the costs of the buttons themselves but also the cost of creating buttonholes.

ASSOCIATED FASTENERS ABOARD VASA

W 03239
Wooden Core of Button. No Plate Available
Found: ÖB, SB, Beams 5-6, 1100 cm from forward
Associated with: Adam
Diameter: 2.0 cm
Maximum Height: 0.5 cm
Minimum Height: 0.2 cm

Found in the same general location as Adam, this is the round wooden core of a button. The wooden core has a hole in the center with a diameter of 0.3 cm. This wooden core would have been wrapped in thread or cloth and attached to a garment as a decoration. The thread or cloth did not survive.

W 07619
Two Pewter Buttons. No Plate Available
Found: ÖB, SB, Beams 14-15, 2490-2720 cm from forward
Associated with: David
Diameter of A: 1.0 cm
Height of Head A: 0.8 cm
Diameter of B: 0.9 cm
Height of Head B: 0.9 cm

This find consists of two pewter buttons with spherical heads. Their metal surfaces are undecorated and dull. One button has a cast eye and shank, while the other has traces of an iron wire eye. The eye of button A is 0.5 cm wide, 0.7 cm long, and 0.1 cm thick; the eye of button B is 0.6 cm wide, 0.6 cm long, and 0.1 cm thick. The two pewter buttons were found in the same area as David. They were associated with W 07618, a jacket fragment.

W 07641
Two Brass Buttons and One Silver Button. Plate 14
Found: ÖB, SB, Beams 14-15, 2490-2720 cm from forward
Associated with: David
Diameter: 0.9 cm

These three buttons have spherical heads with attached brass wire eyes that range from 0.6 to 0.5 cm long. The buttons range in height from 0.8 to 0.9 cm. The brass buttons have a dull, gray-black surface. The silver button has a lustrous surface. All three buttons were found in the same general location as David. Perhaps they were inside the bentwood box, W 07649, found with David.

W 11528
Two Brass Buttons. Plate 15
Found: UB, SB, Beams 18-19, 3111-3266 cm from forward
Associated with: Erik
Diameter: 1.0 cm
Height of Head: 0.7 cm

Archaeologists discovered these two brass buttons near several of Erik’s bones. The buttons have spherical heads with engraved decoration. Apart from two rings around the head’s outer edges, the engravings are difficult to decipher. Similar to other metal buttons, the brass buttons have a dull, gray-black surface. Both buttons have 0.6 cm long and 0.5 cm wide brass wire loops.

W 10272
Twelve Glass Buttons. Plate 16
Found: ÖB, SB, Beams 22-23, 3710-3930 cm from forward
Associated with: Filip
Diameter: 1.1-1.3 cm
Height: 0.8-1.0 cm

These 12 buttons, which vary little in size, are made of smooth, black, semi-matte finish glass. Instead of a spherical design, the glass buttons are slightly flattened and round. While there are currently no eyes attached to the heads, two small holes and iron stains located on the base of each button indicate their prior existence. All 12 buttons were associated with Filip, a silk band (W 10140), and a jacket sleeve fragment (W 10252). Since Filip is male, the buttons likely ran the length of the right jacket breast.

W 10255
Eye. Plate 17
Found: ÖB, SB, Beams 22-24, 3710-3930 cm from forward
Associated with: Filip
Length: 2.1 cm
Maximum Width: 1.6 cm

In addition to the 12 glass buttons, a brass eye from a hook and eye set was found near Filip's remains. The 0.2 cm thick eye has a round loop that is 1.4 cm wide. The loop ends wrap around to form two enclosed eyelets to stitch the eye to the fabric. The end with the two holes is 1.6 cm wide, and the holes have a diameter of 0.4 cm.

W 19529
A Decorated Silver Button. Plate 18
Found: TD, BB, Beams 1-2, 370-519 cm from forward
Associated with: Ivar
Diameter: 1.1 cm
Height of Head: 0.7 cm

Found in the same confined space as Ivar, this silver button has a spherical head with a flat bottom. The head has an engraved decoration. Apart from a single ring around the head's outer edge, the engravings are difficult to decipher. They appear to be a floral pattern. The button has a brass wire eye that is 0.5 cm wide, 0.8 cm long, and 0.2 cm thick. Textile residues are still present on the back of the button head, near the top of the eye.

UNDERWEAR

Underwear served five functions. First, it protected the body from the cold. Second, is supported the shape of the clothes. Third, it protected the skin from the outer clothing and the outer garment from bodily secretion. Fourth, people, especially women, used it in an erotic fashion, and fifth, it served as a method of class distinction (Cunnington and Cunnington 1951:13-40). Until the middle of the nineteenth century, all underclothes were homemade. People constructed them out of linen or silk. They were not fitted until the end of the eighteenth century. Underwear was not constructed out of wool because people feared having wool garments next to the skin, as they often harbored lice (Cunnington and Cunnington 1951:13-40).

There were three types of undergarments in the seventeenth century: the shirt, the half-shirt, and drawers. The shirt had a straight seam across the shoulders. The material was gathered to a narrow neckband. A narrow neck opening existed down the front for easy donning. It was tied with string or lace until the mid-seventeenth century. Shirts had open slits on the bottom of either side. This allowed the garment to be stuffed between the legs. Its width increased from top down. The sleeves were full with no cuffs. High standing ruffles were attached to the wrist and neck collar of shirts until 1620, at which point, the falling ruff replaced the high ruff. A single individual owned very few shirts. The Royal Armory has one of Gustav

II Adolf's undershirts on display (Figure 18). Half-shirts imitate shirts. The difference is that half-shirts ended at the hips. Drawers covered the lower half of the body to the knees. Two types existed in the early seventeenth century. One type was long, full cut, and square. It was tied in the back and fastened with string in the front. The second type were long drawers with stirrups—a band which kept them from slipping up the leg (Cunnington and Cunnington 1951:13-40).

Figure 18. Linen shirt worn by Gustav II Adolf on 24 May 1627 at Kleinwerder, Royal Armory, Inv. No. 3380.

Researchers did not find any examples of underclothes aboard *Vasa*. One can presume, however, that the men wore some sort of undergarment beneath their woolen outer garments. The underclothes were most likely constructed of linen or hemp, so they would have decayed during the 333 years that *Vasa* spent at the bottom of the harbor.

STOCKINGS

Stockings were very popular throughout the sixteenth, seventeenth, and eighteenth centuries. They altered little in shape across the centuries. Unlike hats, gloves, and shoes, stockings never had a chivalric connotation. They began as either tights, covering the entire leg and foot, or as trunk hose—breeches and thigh length stockings sewn together. Breeches and stockings were separated at the end of the sixteenth century. The English, subsequently, called the breeches ‘upperstocks’ and the stockings ‘nether stocks.’ Breeches came down to the knee, where they met the tightly fitted stockings, which were secured with a ribbon or garter above the knee (Farell 1992:5,10-16).

While the poor frequently wore stockings made of wool, the wealthy possessed silk stockings with elaborate embroidery called clocking (Cunnington and Cunnington 1972:61). Gustav II Adolf wore a pair of white silk stockings at his coronation in 1617, which are on display in the Royal Armory (Figure 19). The peasant men in Johannes Lingelbach’s “Peasants Dancing” display coarse woolen stockings (Figure 13). When wearing riding boots, men, especially soldiers, wore woven linen—a tougher material that protected the finer stockings from the inner surface of the boot—boot hose, which had elaborate flair and decoration across the top edge (Farell 1992:10-16). When Gustav II Adolf died in 1632, he had on a pair of white linen boot hose with silk and gold embroidery (Figure 20). In contrast, W 14278, which was found on

Vasa's lower gundeck, starboard side, between beams 10 and 11, is an outstanding example of a less elaborate, plain-woven wool stocking (Figure 21). No complete examples, or even nearly complete examples, were found in association with Vasa's human remains.

Figure 19. A pair of silk stockings from the coronation of Gustav II Adolf in 1617, Royal Armory, Inv. No. 3378.

Figure 20: A pair of boot hose that Gustav II Adolf had on when he died in 1632, Royal Armory, inv. No. 3381.

Figure 21: Wool stocking, W 14278, Courtesy of Vasamuseet.

ASSOCIATED STOCKINGS ABOARD VASA

W 03193
Woven Wool Stocking Fragment. Plate 19
Found: ÖB, SB, Beams 5-6, 1100 cm from forward
Associated with: Adam
Length: 29.5 cm
Width: 8.4 cm

Found in the same area as Adam, this is a small stocking fragment. It is cut and sewn from loosely woven coarse wool. The stocking fragment is twill (four-shaft) woven and undyed. The fragment is heavily damaged.

W 13819b
Woven Wool Stocking Fragment. Plate 13
Found: HS, MS, Beams 13-14, 2067-2197 cm from forward
Associated with: Ludwig
Length: 6.8 cm
Width: 4.5 cm

This stocking fragment is still attached to a portion of breeches, W 13819c. Both were discovered near Ludwig. The plain-woven, undyed wool fragment is extremely coarse. It is not well preserved.

W 23070
Knitted and Woven Wool Stocking Fragments. No Plate Available
Found: Outside *Vasa*, Aft
Associated with: Ylva

According to original excavation reports, a small, circular fragment of a plain-knitted stocking was discovered inside Ylva's shoe (W 23070). There was a woven wool fragment attached to the knitted stocking, which could represent another stocking. This particular find may suggest that knitted socks were around much earlier than historians propose. Currently, historians claim that knitted socks were not commonplace until the late seventeenth century (Looström and Stapf 1983:54-55). More archaeological examples of knitted socks are required before any definite conclusions can be made. The current location of these *Vasa* stocking fragments is unknown.

ADORNMENTS

Early seventeenth-century people decorated their garments in moderation compared to the previous century and later periods. As previously mentioned, all levels of society trimmed the outer seam of their breeches. While the wealthy employed braid, embroidery, and rows of buttons, the poor used woven wool bands. The decorative cloth bands, whether silk, velvet, or wool, date as early as the Viking era. They were called welts or guards. Compared to guards, welts were narrower and round. Both cloth bands became particularly popular during the Elizabethan period. The band's color was often the same color as the garment but a different fabric, creating a subtle decoration. Cloth bands were often sewn into the seams (Mikhaila and

Malcolm-Davies 2006:43). The decorative bands are clearly illustrated on the pants of a doorman, pictured on a 1645 tapestry from the Hässja in Hälsingland, Sweden (Figure 22). Other adornments included embroidered patterns, points (decorative ties with metal tips), and ribbons.

Figure 22. Bibliska Motif, Hässja in Hälsingland, Sweden, 1645, Nordiska Museet, Stockholm, Sweden, NM.0244829:1-77.

ASSOCIATED ADORNMENTS ABOARD VASA

W 03252a
Silk Band. Plate 20
Found: ÖB, SB, Beam 4, 900 cm from forward
Associated with: Adam
Length: 32.6 cm
Width: 0.6 cm

This decorative silk band was found near Adam's remains. The silk band is pattern woven. Adam would have used the band to decorate the outside of his breeches or hat.

W 03223d
Blue-dyed Woven Wool Band. Plate 21
Found: ÖB, SB, Beams 5-6, 1100 cm from forward
Associated with: Adam
Length: 37.4 cm
Width: 2.0 cm

This blue-dyed, decorative, wool band is plain-woven. Similar bands have been found in connection to the seams of breeches. By covering the seam with a decorative band, the sailor made the seam more presentable and stronger. Archaeologists discovered this blue-dyed band in the same area as Adam, along with jacket and stocking fragments.

W 10140
Silk Ribbon. Plate 22
Found: ÖB, SB, Beams 22-24, 3710-3930 cm from forward
Associated with: Filip
Length: 37.3 cm
Width: 2.1 cm

This plain-woven, silk ribbon was found amongst Filip's bones. The ribbon is dark grey, suggesting it is undyed. In order to embellish the sailor's attire, the ribbon would have been tied in a bow, most likely at the top of a stocking.

W 19137
Rolled Brass Thread. Plate 23
Found: TD, SB, Beam 1, 370 cm from forward
Associated with: Ivar
Length: 40.0 cm

Width: 0.1 cm

Discovered in the same confined area as Ivar, this rolled brass wire is thought to be decorative thread. The thread is made up of very thin bands, twisted to form a small wire. The ends of the wire threads are rolled coil spring style. The thread is frail, but in general, it is in good condition. Among other decorative functions, metal thread was often wrapped around wooden cores to form buttons and sword grips.

W 13819d
Blue-dyed Woven Wool Band. No Plate Available
Found: HS, MS, Beams 12-13, 2067-2197 cm from forward
Associated with: Ludwig

Herringbone twill woven with thin blue-dyed wool yarn, this decorative band originally ran the length of a pant seam. Researchers discovered the band alongside partially preserved breeches (W 13819). They found both in the same general location as Ludwig.

STRAPS

During the early seventeenth century, men wore a narrow belt around the doublet waistline. The shoulder belt, or baldric, replaced the belt after 1625 (Cunnington and Cunnington 1972:15). The leather strap served a decorative and utilitarian function. The average person attached a knife sheath to the belt. Soldiers had cartridge tubes and a pouch of musket balls attached to the strap, while noblemen typically had decorative swords.

ASSOCIATED STRAPS ABOARD VASA

W 31129
Leather Strap. Plate 24
Found: ÖB, SB, Beams 14-15, 2490-2720 cm from forward
Associated with: David
Length: 31.0 cm

Width: 2.8 cm
Thickness: 0.4 cm

The strap has a smooth finish on one topside, while the other remains rough. In complete form, it may have been a belt, designed to carry tools, including a knife and its sheath. The find might also be a leftover leather fragment, kept for future repairs. The leather strap was recovered near David.

HEADWEAR

Hats have existed for thousands of years. The oldest known hats, which were constructed out of wool, leather, and fur, date back to the Bronze and Iron Ages. Archaeologists discovered the hats in early Scandinavian houses. It is well known that the Ancient Egyptians, Assyrians, Greeks, and Romans regularly employed hats. By the eleventh century, three forms of head covering existed in Europe: close-fitting caps, hoods, and a hat with a high crown and brim that shaded the eyes. Since headwear styles are dictated by function, the basic shape of caps and hoods have changed little since the eleventh century. By the thirteenth century, artisans specializing in hat making existed across Europe. The hat makers made nine varieties of headwear, including a close-fitting cap and felt hats (Ginsburg 1990:17-19).

During the first half of the sixteenth century, the hat, similar to all fashion, emphasized the breadth of the figure. Two felt hats were popular. The first hat was flat with a deep, soft crown that nearly covered the hat brim, while the other hat was flat with a wide brim and hatband. In the second half of the century, fashion stressed height over breadth, so the crown became more important than the brim. Hats had high crowns and small brims with a variety of hatbands (Ginsburg 1990:32-34).

In the early seventeenth century, the archetypal Pilgrim felt hat, with a high pointed crown and a broad brim, became popular. The trend did not last long, however, because people could not keep the hat on their head during windy and rainy weather. Instead, low-crowned felt hats with floppy brims turned up or arranged in a variety of ways became the norm. These sagged along the top of the crown. Herman Doomer is wearing such a hat in his portrait, painted by Rembrandt Harmensz van Rijn in 1641 (Figure 23). A third type of felt hat gained popularity during the 1620s. The hat had a broad brim and a tapering crown with a flat top. Williem Drost is wearing a hat similar to this style in his 1650s self-portrait (Figure 24). This style of hat was common in most working environments (Ginsburg 1990:45-49). Hats were worn amongst all levels of society, but in earlier centuries, people typically associated the hat with the wealthy and the cap with poor peasantry.

Three types of sixteenth century caps retained popularity during the early seventeenth century. They were made from woven or knitted cloth, instead of felt. Old men and rural men tended to wear a cap with a soft round-fitting crown and a close brim. The brims could be turned up and secured with buttons, so they called the cap a buttoned cap, a style that persisted until 1610. The flat cap, popular only in England, lasted until 1630. It consisted of a flat beret crown and a very narrow circular brim. The Monmouth cap gained popularity in the 1580s and lasted until around 1650. It had a tall, round crown, no brim, a knob on the top, and a loop on the back edge. It was linked to the soldier or sailor (Cunnington and Cunnington 1972:69-70).

ASSOCIATED HEADWEAR ABOARD *VASA*

Archaeologists discovered four types of headwear aboard *Vasa*—three types of felt hats and a wool cap. The first style felt hat has a round, low crown with a wide stiff brim. W 08201,

Figure 23. Rembrandt Harmensz van Rijn, "Herman Doomer," 1641 © The Metropolitan Museum of Art / Art Resource, NY.

Figure 24. Willem Dorset, "Portrait of a Man" (self-portrait), 1653 or 1655 © Metropolitan Museum of Art / Art Resource, NY.

which was found in chest W 08010, is an example of this type. The second style has a wide drooping brim and a higher tapering crown with a flat top. This style is represented by W 12350a (Figure 25). The third style, represented by one fragmentary example, has a low, flat crown with a wide brim. The woolen caps are made of five wedges sewn together. W 18486 is an excellent example of a woolen cap (Figure 26). Only three complete felt hats and one woolen cap were found aboard *Vasa*. All other finds consist of small or large felt fragments. Researchers only found one possible hat fragment near human remains.

W 10262
Felt Fragment. No Plate Available
Found: ÖB, SB, Beams 22-24, 3710-3930 cm from forward
Associated with: Filip
Length: 9.0 cm
Width: 7.5 cm

Considering the design and material of other clothing items found aboard *Vasa*, this nondescript felt fragment probably came from a felt hat. Three nearly complete felt hats were discovered aboard *Vasa*. All other clothing remains are constructed of leather, wool, silk, or linen. The dark colored fragment was found in the same general location as Filip, near the ship's whipstaff.

FOOTWEAR

Shoes began as utilitarian articles of clothing. Humans wished to protect their feet from the natural hazards of climate and terrain. The earliest cave drawings indicate some evidence of foot covering. Archaeologically, the sandal can be traced back at least as far as the ancient Egyptians. Sandals continued to be favored in the warm climates of the Assyrian, Greek, and Roman civilizations. The earliest examples of cold weather footwear came from the Tang

Figure 25. Two types of felt hat, W 08201 (above) and W 12350a (below), Courtesy of Vasamuseet, Stockholm.

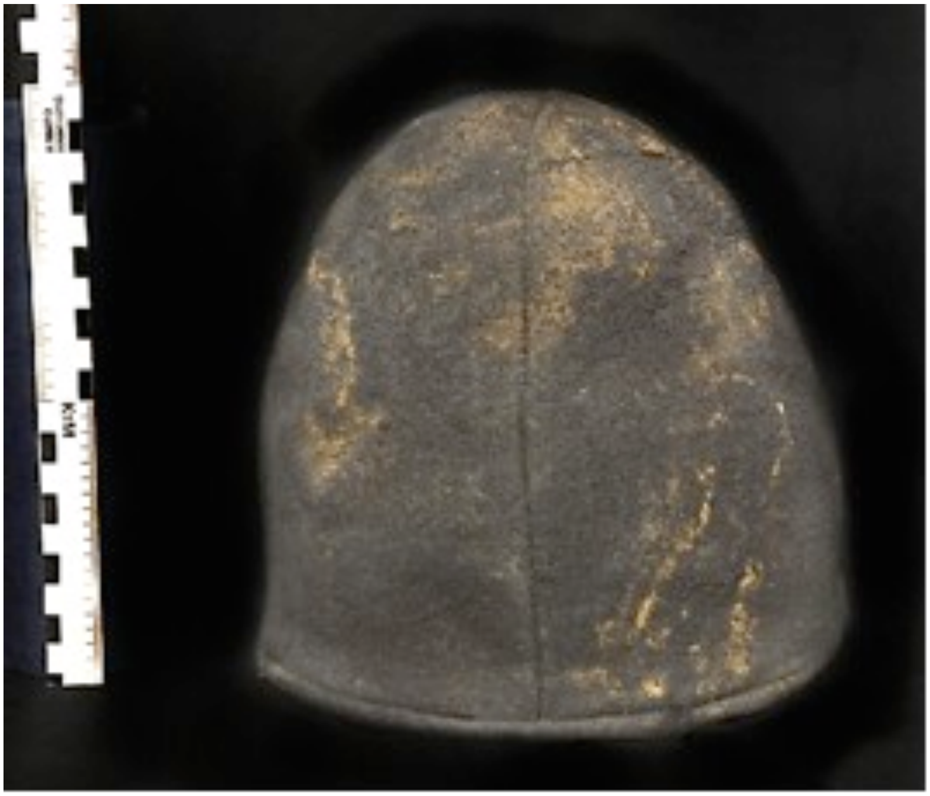


Figure 26. A woolen cap, W 18486, Courtesy of Vasamuseet, Stockholm.

Dynasty of China. The Chinese employed felt boots or fur-lined leather boots. The Roman legions, Assyrian nomads, and Greek hunters also wore leather boots (Brooks 1971:1-11).

Fundamental changes in footwear occurred during the sixteenth century. The shoe conceived during this century would serve as the basic shoe form until the 1960s. The uppers consisted of the vamp, or the shoe front, and two quarters, the backsides of the shoe. Shoes had two soles, an inner and an outer. A strip of leather called a rand or welt was sewn along the bottom edge of the insole, and the top edge of the outer sole was attached to the rand bottom (Figure 27). Shoemakers filled the hollow area between the soles with cork or birch bark, adding comfort and insulation. The toe shape varied; shapes included round, square, and pointed (Swann 2001: 81-88).

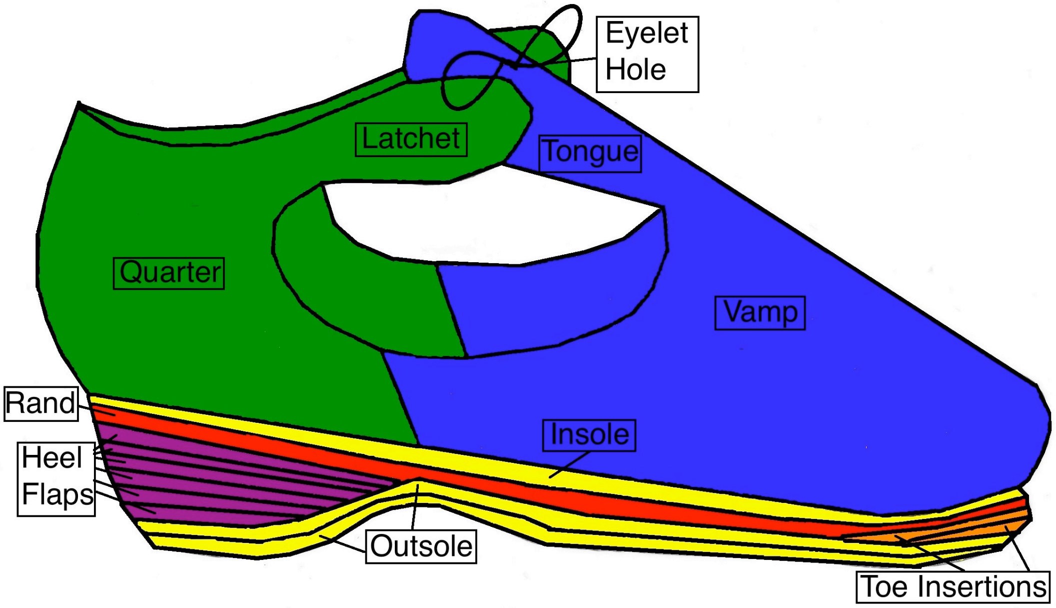


Figure 27. Parts of a seventeenth-century shoe. Drawing by author.

Early seventeenth-century shoes were predominantly black. The Swedes employed both flesh out (suede) and grain out leather in shoe construction. While all social classes used leather footwear, upper class citizens sometimes wore shoes with velvet uppers. The basic forms of footwear did not vary across social classes. During the early seventeenth century, oval or round toes remained popular. By 1625, however, the square toe with rigid toe puffs dominated shoe fashion (Swann 2000:96-97, 2001:102-106).

Heels became very popular during the seventeenth century. Two types of heels existed, the covered heel and the stacked heel. Covered heels were modeled after Spanish *chopines*, whereas stacked heels evolved from repair patches. Wooden pegs held both types of heels together (Swann 2000:96). After 1610, up to 5.0 cm high heels were commonplace in Sweden. By the middle of the century, a distinct heel maker trade existed. High heels created two problems. First, the new type of walking created wear at the toe. To fix this, shoemakers inserted 3.0 cm long pieces of leather between the sole fronts. Second, the shape of the shoe had to be changed to match the new heights. This meant shoemakers had to create multiple lasts, but this was expensive. Shoemakers, therefore, eliminated the right and left shape of the shoe, making all shoes straight. The variation between left and right shoe remained absent until the nineteenth century (Swann 2001:106-108).

The rand remained popular during the early seventeenth century. Sometimes stitching from the rand was visible along the edges. The waist of the footwear became extremely narrow, 2.0 cm, from 1605 to 1610. At times, cobblers sewed the soles with the uppers turned out. These shoes, stitchdowns, required two rows of stitching for strength. The back seam of the footwear was V-cut to avoid strain along the ankle (Swann 2001:108-111).

Five types of footwear existed in early seventeenth-century Sweden: tie shoes, thigh length boots, buskins, slippers, and pantofles. The most common shoe, the tie shoe, consisted of a vamp with a tongue, two quarters that extended into latchets, outer soles, inner soles, and heel patches. The latchets were tied together over the tongue with laces. The tongue had one eyelet, and each latchet had two eyelets for lacing (Swann 2000:96-97). In 1605, shoemakers cut away the uppers at the top of the seam, leaving an opening along the side. This permitted the wearer to comfortably tie the latchets together. The hole eventually became a fashion trend (Swann 2001:109).

From 1610 to 1660, men wore thigh length boots for walking, riding, and fighting. The Scandinavian bootleg had heavier tops and thinner bottoms, which left the ankle free for walking. While the English and French pulled the top of their bootleg down and back up, the Scandinavians and Germans kept their bootlegs pulled up to their thighs. Scandinavian boots had pointed toes, and the typical boot had spurs. Men attached a spur leather to the boot to hold the spur. The spur leather had rows of cuts across the center to allow it to bend around the ankle.

The butterfly shape became popular after 1625. Buskins were calf high boots, laced in the front. They were greased black and were considered work boots (Swann 2000:96-97).

Slippers and pantofles were overshoes, worn over boots or tie shoes. Whereas men and women wore slippers indoors, they wore pantofles outdoors. People wore pantofles to protect the shoe from the environment. Pantofles were flat-soled mules—a half-slipper shoe—with short vamps. Both the nobility and peasants owned overshoes (Swann 2000:96-97).

Shoemakers decorated footwear in five ways during the seventeenth century. Until 1620, the vamps of shoes had pinking in rows, circles, or rosettes. The wealthy often embroidered their shoes with threads or silk. More commonly, shoes had rosettes that covered the lace. The rosettes were threaded onto the lace through a second hole in the tongue. Some men painted the heels of their shoes red as an embellishment, and as a final form of decoration, people impressed, scored, or stamped the soles of their shoes with patterns (Swann 2001:119-120).

ASSOCIATED FOOTWEAR ABOARD **VASA**

Three types of shoes were found aboard *Vasa*: the tie shoe, the semi-slipper, and the boot. The tie shoe is designated by two latchets tied together over a tongue with lace (Figure 28). Semi-slippers lack the clasp and heel cover of a tie shoe (Figure 29). They are mules with extra thick soles. Half-slippers would not have been employed as an overshoe. *Vasa* boots consist of long narrow-fitting legs that can be turned over (Figure 30).

Over 300 shoe fragments and shoe parts were found on *Vasa*. Shoe specialist June Swann (2001) conducted a full-scale analysis of the shoes in the late 1990s and early 2000s. Swann concluded that *Vasa* had examples of both flesh-out and grain-out leathers on boots and shoes. Most of the shoes aboard *Vasa* are oval toed, but a few square-toed examples exist. *Vasa* shoes have stitching holes inside the toe where a toe puff was attached as reinforcement. The back seams of every shoe are V-cut. They all have 5-6 heel flaps and some have 2-3 front flaps. The mules have more heel flaps. Soles are generally straight, and several examples have narrow waists. Stitchdown construction was employed on a number of the boots and shoes. A few of *Vasa*'s shoes have visible stitching along the edge of the rand. The tongues only have one eyelet hole, suggesting the absence of rosettes. The *Vasa* boots are pointed in the front and have loops on each side to assist in pulling them down. At least one boot shows signs of being turned down (Swann 2001:102-112).

Figure 28: A leather tie shoe from *Vasa*, W 08071, Courtesy of Vasamuseet.

Figure 29: A leather half-slipper from *Vasa*, W 08203, Courtesy of Vasamuseet.

Figure 30. A leather boot from *Vasa*, W 03015, Courtesy of Vasamuseet, Stockholm.

Thirty-three shoes or shoe fragments were found in close proximity to human remains. Thirteen finds represent tie shoes, two represent semi-slippers, and one may represent a boot. Seventeen finds, either too fragmentary or consisting of only the bottom portion, could not be identified to a particular shoe type. Only two pairs of shoes can be definitively associated to a single individual. These are the tie shoes of Helge and Ylva, which were found on the skeleton's feet. Shoes aboard *Vasa* are constructed out of three materials: leather, cork, and wood. Leather was used for the uppers, the quarters, the soles, the heel, and all other shoe parts, while cork and wood were only used for the sole and heel. Due to the large quantity and fragmentary quality of

Vasa shoes and the small percentage of definitive associations, individual images and descriptions are not included within this chapter. Instead, Appendix A has a complete listing of shoes, including their descriptions.

HANDWEAR

As one might guess, gloves and mittens are products of cold climates. Mittens likely predated gloves. They were easier to don when the weather turned ugly (Webb 1907:94-95). Mittens, unlike gloves, have one compartment for the fingers and one for the thumb. During the seventeenth century, mittens were characteristically made with gauntlets or collars. Mittens were either elegant or made of stout leather. They were normally used for work, so they are associated with the lower classes (Cunnington and Cunnington 1972:76).

Gloves have been found among the artifacts of Paleolithic cave dwellers. The earliest examples were made of leather with leather thread (Gilman et al. 1909:773). Both Xenophon and Homer mention gloves, suggesting the Greeks and Persians used them. Roman scholar and writer Marcus Terentius Varro mentions gloves in his treatise *De Re Rustica* (Hull 1834:8). While the Greeks only employed gloves as a form of protection when completing difficult tasks, the Romans wore gloves as ornamentation and as a sign of rank. Following the Norman Conquest, gloves became an important article of dress. Soon guilds of glove makers appeared in England and France. By the sixteenth century, all levels of society wore gloves, which were constructed out of leather, wool, or silk (Gilman et al. 1909:773).

Cloth gloves were cheaper than leather gloves and women found them cooler and lighter to wear. They were relatively uncommon during the seventeenth century, but by the nineteenth century, they were extremely fashionable amongst women. Alternatively, both men and women wore knitted gloves and mittens. Seventeenth-century Europeans considered knitted gloves practical and inexpensive, but they lacked the glamour of leather gloves. Poorer classes quickly adopted warm, cheap knitted mittens and gloves (Cumming 1982:17-19).

A distinguishing feature of seventeenth-century fashionable gloves was the great length of their fingers. The little finger is as long as the rest. All the fingers may have been stuffed or padded. Two types of gloves existed during the seventeenth-century: gloves with gauntlets, or collars, and plain gloves. From 1595 to 1630, some collars consisted of six to eight sections, which ended in tabs or scallops above the wrist. Other collars were made up of a single piece of cloth. The wealthy citizens' collared gloves were often elaborately embroidered. The Royal Armory has a pair of elaborately embroidered gloves, which may have belonged to Baron George Fleetwood (Figure 31). A plain glove, on the other hand, lacked embroidery. They were made with soft leather and extended well above the wrist. The upper border was often turned down to form a small cuff (Cunnington and Cunnington 1972:75-76).

Figure 31. Gauntleted gloves from the early seventeenth century, Royal Armory, Inv. No. 17/5 (21059-60).

ASSOCIATED HANDWEAR ABOARD VASA

Gloves and mittens found aboard *Vasa* consist almost entirely of leather gloves. Generally they are cut from a single piece of leather, folded, and stitched together. The mittens and gloves generally have leather collars, which are decorated along their bottom edge. The decoration consists of jagged half circles that have round holes along their inner, bottom center. W 08216, a right-handed mitten, clearly demonstrates this general form (Figure 32). This mitten and its mate (W 08217) were found in a seaman's chest on the starboard side of the upper gundeck, near beam 2.

Figure 32: Right-handed leather mitten, W 08216, Courtesy of Vasamuseet.

Archaeologists uncovered only one complete mitten made in nalbinding, which is similar to crochet (Figure 33); they found it inside a leather mitten. Work on a ship would have quickly worn apart a mitten made in nalbinding, while a leather glove was more resistant to wear. While the mitten made in nalbinding kept the wearer's hands warm, the leather mitten resisted the wear and tear of shipboard life. Despite the limited number of archaeological examples, *Vasa* seamen probably consistently employed cloth gloves and mittens. All the gloves and mittens found with human remains are sewn from leather.

W 31160
Four Leather Mitten or Glove Fragments. No Plate Available
Found: ÖB, BB, Beams 7-8, 1330-1490 cm from forward
Associated with: Beata/Cesar

This find consists of three pieces from the top of a leather glove or mitten and a square piece of leather. The mitten or glove top fragments have two rows of stitching holes along their edges. This is probably where a decorative collar would have been attached. The square fragment of leather may represent a patch. All four leather fragments were found near the skeletal remains of both Beata and Cesar, so there is no way to determine who owned them.

Figure 33. An inner knitted wool mitten from *Vasa*, W 21116, Courtesy of Vasamuseet, Stockholm.

W 07614
Three Leather Mittens. Plate 25
Found: ÖB, SB, Beams 14-15, 2490-2720 cm from forward
Associated with: David

Found in the same area as David, this finds consists of two left-handed mittens, a single right-handed mitten, a mitten thumb, and two leather fragments. Mitten W 07614 is left-handed and cut from a single piece of leather, folded, and stitched together. The back of the mitten contains a recess for the thumb. A portion of the thumb is still attached. The partner to mitten W 07614 is W 07614:1, which was made the same way but lacks a surviving thumb. Mitten W 07614:2 is another left-handed mitten without a thumb. The back of this mitten is longer than its palm. The mitten thumb, W 07614:3 was made from a single piece of leather, folded and stitched together.

W 07616
A Leather Mitten or Glove Collar. Plate 26
Found: ÖB, SB, Beams 14-15, 2490-2720 cm from forward
Associated with: David

This find consists of two collar fragments, a portion of the palm, and a portion of the back. One side of each fragment has stitching holes by which the fragments were attached to the main body. The other side is decorated with jagged half circles with 0.2 cm wide round holes along their bottom center. The collar appears to have expanded from the wrist to the decorated end. Both fragments were found in the same general location as David, suggesting they might be associated with W 07614, three mittens.

W 31135
Leather Mitten Thumb Fragments. No Plate Available
Found: ÖB, SB, Beams 14-15, 2490-1720 cm from forward
Associated with: David

Separated from W 07615, a leather shoe, this find may be associated to W 07614 and W 07616, mitten fragments. The find was in the same general location as David. It consists of a single, two-piece thumb and two fragments from the back of another thumb.

W 07650
Eight Leather Mitten Fragments. No Plate Available
Found: ÖB, SB, Beams 14-15, 2490-2720 cm from forward
Associated with: David

Made of thick leather, this find is eight mitten fragments from two mittens. The fragments include three upper or lower thumb fragments. All three have visible stitching holes along their outer edges. A rectangular piece of leather, which may represent a patch or enhancement, is included. There is also a long, narrow piece of leather, which has portions of a leather tie attached to it. The three remaining fragments are unspecified, triangular leather strips. Archaeologists discovered these fragments near David.

W 11531
A Left Leather Mitten. Plate 27
Found: UB, SB, Beams 18-19, 3111-3266 cm from forward
Associated with: Erik

Similar to other nearly complete mittens, this mitten is cut from a single piece of leather, folded, and stitched together. Along the back of the mitten, a triangular piece of leather was partially cut out, creating a recess for the thumb. Ultimately, the protruding triangular-shaped fragment became part of the thumb. Stitching holes are visible along all edges. In addition to the main body of the mitten, either the palm or back of the mitten collar is intact. The base of the collar, which attached to the mitten base, is straight cut with visible stitching holes. The other side of the collar is decorated with jagged half circles with 0.2 cm wide round holes along each half circles' bottom center. While the outside of this leather mitten has a smooth finish, the interior is rough. The mitten was found in the same general location as several of Erik's bones.

W 16499
Leather Mitten Fragment.
Plate 28
Found: HS, BB, Beams 19-20, 2990-3147 cm from forward
Associated with: Erik

This single mitten fragment was found in the same general location as some of Erik's skeletal remains. It is either the lower back of a mitten, the lower palm of a mitten, or an enhancement from an existing mitten. Stitching holes are present along every side of the fragment's outer edges. The front of the fragment has a smooth finish.

W 31006
A Leather Glove. Plate 29
Found: TD, BB, Beams 1-2, 519 cm from forward
Associated with: Ivar

Found in the same confined area as Ivar's bones, this find consists of two parts of a leather glove. One portion consists of the thumb with seams intact, while the other fragment constitutes the little finger, ring finger, and middle finger. There are also several unspecified fragments made from the same leather and fitted with stitch holes. These are probably remnants of the glove palm.

W 31045
Leather Mitten Thumb Fragment. No Plate Available
Found: MS, HS, Beams 11-13, 1908-2221 cm from forward
Associated with: Ludwig

Archaeologists discovered this small thumb fragment near Ludwig's hands. The thumb has large stitching holes along its outer edges.

W 31058
Leather Glove Collar. Plate 30 and Plate 31
Found: MS, HS, Beams 12-13, 2075-2221 cm from forward

This find comprises four large fragments and a single small fragment from a leather glove collar. The edge of the collar is decorated with jagged half circles with round holes along each half circle's bottom center. There are stitching holes visible along the inner edge of the largest fragment. The glove collar appears to have expanded from the wrist to the outer end. It was found close to Ludwig's hand bones.

W 31158
A Pair of Fragmentary Leather Mittens. No Plate Available
Found: HS, MS, Beams 11-13, 1908-2221 cm from forward
Associated with: Ludwig

Both mittens were cut from a single piece of leather, folded, and stitched together. The right mitten is better preserved than the left. Parts of the left mitten's sides and middle are fragmentary, and most of the lower part is missing. At least one mitten collar is preserved with the typical collar decoration—jagged half circles with 0.2 cm wide round holes along each half circles' bottom center. The mittens were found near Ludwig's hand bones.

MISCELLANEOUS CLOTHING FRAGMENTS

In addition to the aforementioned, twelve finds, five labeled as textile fragments and seven designated as leather fragments, were discovered in association with human remains aboard *Vasa*. These twelve finds are so fragmentary and brittle that they cannot be identified or accurately measured. These unidentifiable finds provide further indication that this study cannot recreate the entire historical setting. This evidence, similar to all archaeological evidence, is fragmentary.

CONCLUSIONS

This chapter analyzes the clothing fragments found in association with *Vasa*'s human remains, in reference to seventeenth-century clothing trends. These various items of clothing and their basic descriptions are recapitulated in Table 2 according to individual association and will be interpreted in more detail in Chapter 6. Based on the above analysis, it is clear that clothing serves four functions: utility, adornment, modesty, and communication. The latter is most important to this thesis. As a form of communication, sailor dress has the ability to differentiate sailors from others, such as aristocrats and peasants, while concurrently asserting social integration. Yet, as the above descriptions demonstrate, sailor dress does not differentiate sailors from others. Rather it asserts their integration into the whole of Swedish society. The sailors did not differentiate themselves by occupation.

Early seventeenth-century sailor fashion was nearly identical to early seventeenth-century civilian fashion; it was simple in design and form. The basic Swedish outfit—sailor and civilian—combined the Baroque, courtly styles of France with the moderate, middle-class fashions of the Dutch and Germans. It included linen shirts, drawers, doublets (or jackets), knee breeches, stockings, tied shoes, felt hats or woolen caps, and mittens or gloves. The main source of adornment was a trim along the outer seam of the breeches.

Table 2: Clothing Found in Association with Human Remains Aboard *Vasa*

Artifact Type	***Find No.***	***Association***	***Exact Location***	***Noteworthy Features***
Jacket back panel fragment	03223e	Adam	ÖB, SB, Beams 5-6	Plain-woven drab, undyed, brown wool; wool is fulled; straight cut waist
Nondescript jacket fragment	03223b	Adam	ÖB, SB, Beams 5-6	Plain-woven drab, undyed, brown wool; wool is fulled
Jacket front panel fragment	08942	Adam	ÖB, SB, Beams 5-6	Plain-woven drab, undyed, brown wool; wool is fulled; evidence for iron hooks and eyes; traces of linen thread
Silk band	03252a	Adam	ÖB, SB, Beams 4	Pattern woven
Blue-dyed woven wool band	03223d	Adam	ÖB, SB, Beams 5-6	Blue-dyed, plain-woven wool
Wooden core of button	03239	Adam	ÖB, SB, Beams 5-6	Would have probably been wrapped in thread or cloth
Woven wool stocking	03193	Adam	ÖB, SB,	Cut and sewn from loosely

			Beams 5-6	woven coarse wool
Jacket sleeve	03261	Beata	ÖB, SB, Beams 5-6	Brown, undyed, plain-woven, wool; wool is fulled; rolled hem at wrist
4 leather mitten/glove fragments	31160	Beata	ÖB, BB, Beams 7-8	3 pieces from top of a leather glove or mitten and a square piece of leather
Jacket/breeches fragment	09323	Cesar	ÖB, SB, Beams 8-9	Plain-woven, brown wool; appears new or underused
4 leather mitten/glove fragment	31160	Cesar	ÖB, BB, Beams 7-8	3 pieces from top of a leather glove or mitten and a square piece of leather
Blue-dyed jacket fragment	07618	David	ÖB, SB, Beams 14-15	Blue-dyed, plain-woven, white wool, broadcloth;
2 pewter buttons	07619	David	ÖB, SB, Beams 14-15	Undecorated, dull, and spherical; associated directly with jacket
2 brass buttons and 1 silver button	07641	David	ÖB, SB, Beams 14-15	Have attached brass wire eyes; brass ones have a dull, gray-black surface; silver one has a lustrous surface
Leather strap	31129	David	ÖB, SB, Beams 14-15	Smooth finish on top; bottom rough; could be belt or leftover fragment
3 leather mittens	07614	David	ÖB, SB, Beams 14-15	Two left-handed mitten, a single right-handed mitten, a mitten thumb, and two leather fragments
A leather mitten/glove collar	07616	David	ÖB, SB, Beams 14-15	Two collar fragments, a portion of the palms and a portion of the back
Leather mitten thumb fragments	31135	David	ÖB, SB, Beams 14-15	A single, two-piece thumb and two fragments of another thumb
8 leather mitten fragments	07650	David	ÖB, SB, Beams 14-15	From two mittens; includes three upper or lower thumb fragments, a rectangular piece of leather, a long, narrow piece of leather, and three unspecified triangular leather strips

2 jacket fragments	18414a, b	Erik	TD, BB, Beams 16-17	Plain-woven, undyed, black sheep wool; iron stains visible
Jacket sleeve	18415	Erik	TD, BB, Beams 16-17	Plain-woven, undyed, black sheep wool; represents top of a straight cut sleeve will rolled hem at wrist; sewn holes and linen thread pieces visible
2 brass buttons	11528	Erik	UB, SB, Beams 18-19	Spherical heads and engraved decoration; dull gray-black surface
A left leather mitten	11531	Erik	UB, SB, Beams 18-19	A nearly complete mitten cut from a single piece of leather, folded, and stitched together
Leather mitten fragment	16499	Erik	HS, BB, Beams 19-20	The lower back, lower palm, or an enhancement of a mitten
Jacket sleeve	10144	Filip	ÖB, SB, Beams 22-24	Twill (three shaft) woven, coarse, undyed brown wool; portions of upper and lower straight cut sleeve; linen thread visible; associated with 12 glass buttons
Silk ribbon	10140	Filip	ÖB, SB, Beams 22-24	Plain-woven silk ribbon; dark grey and undyed
12 glass buttons	10272	Filip	ÖB, SB, Beams 22-23	Slightly flattened and round; two holes for iron eyes; associated with jacket
Brass eye	10255	Filip	ÖB, SB, Beams 22-24	Brass eye from a hook and eye
Felt fragment	10262	Filip	ÖB, SB, Beams 22-24	Nondescript felt fragment
Yellowish-brown Jacket	14292	Helge	UB, BB, Beam 13	Half of a yellow-dyed, diagonal twill (4-shaft) woven jacket; wool is brown and fulled; straight cut sleeves

Yellowish-brown fragment	14293	Helge	UB, BB, Beam 13-14	Plain-woven, fulled, yellow-dyed, brown wool; one upper leg portion
Tie Shoes	14562	Helge	UB, BB, Beam 13	Two pieces of the birch bark soles are present. Holes from wooden pegs and stitching are visible.
Tie Shoes	14563	Helge	UB, BB, Beam 13	Two pieces of the birch bark soles are present. Holes from wooden pegs and stitching are visible.
Decorated silver button	19529	Ivar	TD, BB, Beams 1-2	Spherical head with a flat bottom; engraved decoration, perhaps a floral pattern; textile residues present
Rolled brass thread	19137	Ivar	TD, SB, Beams 1	Decorative thread; could have been used for button or sword grips
Leather glove	31006	Ivar	TD, BB, Beams 1-2	Fragments of the thumb, little finger, ring finger, and middle finger of a glove
3 jacket skirt fragments	17664a, b, c	Johan	HS, BB, Beams 6-7	High quality, blue-dyed broadcloth; fine twill (3-shaft) woven; linen thread visible; close fitting and long waisted with deeper skirt tabs
Jacket fragment	11696	Ludwig	HS, MS, Beams 12-13	Plain-woven, undyed wool; no finished edges
Jacket front panel	13819a	Ludwig	HS, MS, Beams 12-13	Plain-woven, undyed wool; visible metal stains, perhaps from iron hook and eyes
Knee-length breeches	13819b, c	Ludwig	HS, MS, Beams 12-13	Plain-woven, grayish-brown, undyed wool; wide waist with pleating; taper to a hemmed bottom; front or back of a pair of breeches; maintain entire length and width
Woven wool stocking	13819b	Ludwig	HS, MS,	Plain-woven, undyed,

fragment			Beams 12-13	coarse wool
Blue-dyed woven wool band	13819d	Ludwig	HS, MS, Beams-12-13	Herringbone twill woven with thin blue-dyed yarn; found alongside partially preserved breeches
Leather mitten thumb fragment	31045	Ludwig	HS, MS, Beams-12-13	Small thumb fragment
Leather glove collar	31058	Ludwig	HS, MS, Beams-12-13	Five glove collar fragments; decorated with jagged half circles with round holes along each half circle's bottom center
Pair of fragmentary leather mittens	31158	Ludwig	HS, MS, Beams-12-13	A left and right mitten cut from a single piece of leather, folded, and stitched; one decorative collar present
Tie Shoe	23069	Ylva	Outside of the Ship	The heel was composed of five heel flaps, which were placed between the outer and inner soles. Insole leather is 0.6 cm thick and very strong.
Tie Shoe	23070	Ylva	Outside of the Ship	The bottom is composed of three soles and 5 heel flaps. The sides of the shoes are attached to each other along the center back.
Knitted and woven wool stocking fragments	23070	Ylva	Outside of the Ship	Circular fragment of plain-knitted stocking; attached woven wool fragment

CHAPTER 5: ACCOUTERMENTS AT SEA

“So long as the great majority of men are
not deprived of either property or honour,
they are satisfied” (Machiavelli 1989:67).

Since prehistoric times, portage has been an intrinsic function of dress. Humans chose to carry their valuable possessions nearby. They also found it necessary to carry utilitarian items that they might need to use at any moment, such as knives. By carrying objects in their pockets, pouches, or bags or on belts, they freed their hands for other tasks. Modern archaeologists have much to gain from the study of historical possessions, for each possession, similar to each garment, is an assertion of its owner’s power, wealth, occupation, beliefs, values, and identity.

This chapter focuses on the various personal belongings and utilitarian items found in association with *Vasa*’s human remains. These artifacts are considered in regard to the common personal belongings of the period and utilitarian items regularly employed on a man-of-war. The sailors’ possessions are divided into nine categories: cutlery, hygiene materials, coinage, keys, lanterns, smoking paraphernalia, books, tools, and weaponry. Following general descriptions of each type of possession, this chapter includes an archaeological catalog for each non-clothing item found with *Vasa*’s human remains.

CUTLERY

Long before humans created useful objects from metal, they employed shells as eating utensils. Over time, to increase convenience, they began adding wooden or bone handles to the shells. Thus, prehistoric people created the spoon (Roberts 1967:102). Archaeological evidence suggests that in Paleolithic times, people employed narrow scoops as spoons, and in later Neolithic times, the clay spoon evolved. Ancient Egyptians employed metal spoons, bronze spoons were commonplace during the Bronze Age, and the Romans employed deep, fig-shaped, silver spoons. Most of these early spoons were either employed in the kitchen or served ceremonial purposes. By the seventeenth century, however, people regularly employed the spoon during food consumption (Himsworth 1953:114-115).

In general, the shape and size of the spoon depended on function. The basic form, however, did not change until the eighteenth century. Round spoon bowls always existed. Then, in the seventeenth century the elliptical or ovoid spoon was developed. It rapidly gained popularity, and by the eighteenth century had replaced the round spoon (Defenbacher 1951:36,38). The spoon handle evolved the most. Between the sixteenth and seventeenth centuries, spoon handle cross-sections ranged from round or quadrangular to a flattened rectangular shape (Coffin 2006:48). Spoon handles and early fork handles had straight stems (handles) or a flat profile. In the early eighteenth century, the modern arched form came into existence (von Drachenfels 2006:169).

Spoons varied in material. Some were made of bronze, silver, pewter, latten, or gold, while others were carved from ivory or wood. At the beginning of the seventeenth century, silver was the most desirable material for the eating utensil. The upper class swarmed to buy silver spoons. This is when the phrase "born with a silver spoon in his mouth" came into existence (Coffin 2006:48). The silver spoon was desirable for two reasons: 1) it imparted a sense of grandeur and 2) as compared to other metals, it interacted less with foods. Alternatively, the wooden spoon was extremely popular amongst the peasants. The popularity of wooden eating utensils, especially in Northern Europe, came from the Anglo-Saxons. The Anglo-Saxon word for spoon was *spon*, which means "a chip of wood" (Coffin 2006:47-48).

Jacob Jordaens clearly illustrates two wooden spoons in his 1622 painting “Satyr in a Peasants House” (Figure 34).

Figure 34. Jacob Jordaens, "Satyr in a Peasant House," 1622, Puschkin Museum, Moscow, Russia © ARTOTHEK.

The form of a fork dates back over 3000 years. For instance, the Greek god Poseidon is often pictured holding a triton. Serving forks, however, did not appear until A.D. 600 (Roberts 1967:102-106). The precursor of the two tined, serving fork was the skewer—a forked stick used in preparing and serving historic foods. Early cooking forks, typically two-pronged, also existed (Defenbacher 1951:18-20). During the eleventh century, Italians began using the fork to eat sweetmeats. By the late fifteenth century, table forks were commonplace throughout Italy. Elsewhere, it was considered a strange novelty, and most people saw little need for it. France, Switzerland, Germany, Holland, and eventually, England and America began adopting the table fork in the sixteenth and seventeenth centuries. The Scandinavian countries were the last major European countries to adopt the practice of eating with a fork; they accepted the fork in the late seventeenth century (Coffin 2006:33). During the early stages of the fork's acceptance, mainly the rich and nobility owned table forks; they were highly regarded personal items. Aboard a seventeenth-century ship, like *Vasa*, it is unlikely that any sailor below the rank of officer owned a fork.

Religious beliefs played a part in the late adoption of the fork. While the spoon was associated with christening and representations of the Virgin Mary and the twelve apostles, and the knife was linked with life's essence (bread), the fork had the connotation of the Devil's pitchfork and seduction. In addition, unlike the spoon and knife, the Christian Church did not acknowledge the fork as a part of life's basics. Its practicality, alone, allowed it to overcome these criticisms and become socially acceptable (Coffin 2006:33,37).

The two-tined table fork began as a stabilizer for cutting meat. In the late eighteenth century and beyond, people employed the fork as a way to convey food to the mouth. The more tines a fork had the more food that could be transported to the mouth. Fork tines were straight, flat, and sharp. Three-tined forks became popular in the early eighteenth century, while four- and five-tined forks gained popularity during the late eighteenth century (Coffin 2006:40). Meanwhile, the handles of early table forks resembled those of high-class spoons and knives, made of ivory and expensive woods.

While forks were not accepted in the now familiar trio of table cutlery until the late seventeenth century, knives date back nearly two million years. The earliest knives were stone with a sharp edge. By the Neolithic period, stone knives were being paired with handles made of wood, moss, or hide. During the Bronze Age, the first metal blades appeared. At least two components of Bronze Age knives were retained in later centuries, the bolster and the tang. The bolster was a solid area of metal connected to the end of the blade near the handle. It prevented the blade from becoming stressed and bending during use. Cast as part of the bolster, the tang was a spike of metal that the organic handle could be fastened on to. By 1000 B.C., people began employing iron blades, which were sharper and more durable (Moore 1995:3-5). Prehistoric and early historic people employed knives for eating, maintaining hygiene, cooking, hunting, carving, and fighting. The value of knives in prehistoric societies is evident by the practice of burying the dead with their knives (Himsworth 1953:34-35).

During the medieval period, the proportion of handle to knife became roughly equal. Until the mid-sixteenth century, when the price of steel decreased, medieval blades were forged from wrought iron with a steel cutting edge. The handles were typically made of horn, wood, bone, or dudgeon (the root of a box tree). Richer patrons, however, had ivory handled knives. The end of each handle was protected by a metal band or collar. Dutch and Flemish knives had handles that terminated in plaques of copper alloy, with engraved figures and faces. People often carried knives on their persons. Most carried the knives in leather sheaths, but poorer individuals merely pierced the handle and inserted a cord that they wore around their waist (Moore 1995:6-9). Adriaen Brouwer illustrates the practice of carrying a knife without a sheath in his early-seventeenth century (c.1630) painting “A Tavern” (Figure 35). The man in the blue-dyed woolen jacket has merely placed a knife inside his belt.

From 1550 to 1650, the knife blade was hand forged entirely of steel. Smiths forged the bolster and tang as one unit, which, in turn, they forged onto the steel blade. The connection

Figure 35. Adriaen Brouwer, "A Tavern," c. 1630, Alte Pinakothek, Munich, Germany © Blauel/Gnamm – ARTOTHEK.

swaging a blade, grinding the upper edges of the blade to enhance piercing power, became popular. While the back of the blade remained straight, the blade edge curved out (Moore 1995:10-12). The knife pictured in Adriaen Brouwer's seventeenth-century painting "Inn with Drunken Peasants" is fashioned in this manner (Figure 36). The knife blade has been driven into the center of the table. Until the end of the seventeenth century, the knife, with its sharp point and curved edge, served the purpose of eating tool, working tool, and weapon. People generally stopped using the knife as an eating tool once Europeans adopted the fork (Defenbacher 1951:18-19).

Figure 36. Adriaen Brouwer, "Inn with Drunken Peasants," c. 1625-1626, Mauritshuis, The Hague, The Netherlands, Inv. No. 847.

As the knife became commonplace, cutlers and hafters began to elaborately decorate the knives' bolsters and handles. While affluent people's knives were made of silver or carved amber with golden leaf engravings, simpler knives continued to have metal, wood, or cheaper bone handles. The simpler handles were shaped like a club or cylinder. Sheaths also became more elaborate. Wooden tubes, especially those covered with embroidered silk, gold cloth, and stitched with seed pearls, grew in popularity (Moore 1995:12-15).

Archaeological evidence suggests that Stone Age men found it uncomfortable to carry their knives without protective coverings. Carrying the blade unprotected would also make it dull more quickly. They covered their flint cutting implements with hide sheaths, which they affixed to a girdle. This practice continued amongst the Egyptians, Romans, and Vikings (Himsworth 1953:161). The man wearing a red jacket in Jan Miense Molenaer's 1637 painting "The Five Senses: Taste" has a knife sheath attached to his belt (Figure 37). By the fifteenth century, people carried table knives, combined with spoons and later forks, in leather or wood traveling cases. At the turn of the seventeenth century, only wealthy households supplied a guest with cutlery. Another century would pass before peasants adopted this practice (Himsworth 1953:161-162). As the average host began supplying forks, knives, and spoons, cutlery became less personalized. All of the tableware, including spoons, found aboard *Vasa* is the subject of another East Carolina University thesis by Stephanie Gandulla.

ASSOCIATED CUTLERY ABOARD **VASA**

W 03171
Wooden Spoon. Plate 32
Found: ÖB, SB, Beams 5-6, 1100 cm from forward
Associated with: Adam
Length: 14.9 cm
Width: 6.3 cm

This wooden spoon was found in the same area as Adam's bones. The spoon bowl is oval shaped with a length of 8.2 cm and a width of 6.3 cm. The egg-shaped spoon bowl is 1.0 cm deep. The bowl thickness gradually decreases from 0.9 cm at the handle to 0.3 cm at the spoon's end. Carved into three ledges, the spoon handle is 6.5 cm long, 1.7 cm shorter than the spoon bowl. It is 1.6 cm wide and 0.8 cm thick. The profiled handle comes to a point at the end, and has visible traces of paint. In totality, the spoon is well preserved except for a small crack along the back of the bowl.

Figure 37. Jan Miense Molenaer, "The Five Senses: Taste," 1637, Mauritshuis, The Hague, The Netherlands, Inv. No. 576.

W 04282
Wooden Spoon. Plate 33
Found: ÖB, SB, Beams 5-6, 1100 cm from forward
Associated with: Adam
Length: 9.5 cm
Width: 2.8 cm

Found adjacent to Adam's bones, this wooden spoon is broken into two parts. One portion of the spoon, which is 4.5 cm long, consists of the upper portion of the spoon bowl and the base of the wooden handle. The second portion represents the upper half of the handle, 5.0 cm. The general shape of the spoon bowl cannot be determined because only a fragment of the bowl—2.5 cm x 2.8 cm—remains intact. The shaft is straight with a circular cross section and flat profile. Approximately 5.5 cm of the 7.0 cm long handle has a diameter of 1.0 cm. The final 1.5 cm of the spoon handle is carved into a knob with a 1.6 cm diameter.

W 03222 [Renumbered W 27113]
Wooden Knife Handle. Plate 34
Found: ÖB, SB, Beam 5, 1100 cm from forward
Associated with: Adam
Length: 8.5 cm
Width: 1.6 cm

Found adjacent to Adam's bones, this elongated wooden handle has an oval cross-section with a maximum diameter of 1.3 cm. The handle is tapered and slightly curved. At the narrow end of the handle, a rectangular slot, where the now decayed metal tang would have been inserted, is visible. The slot is 1.3 cm long and 0.2 cm wide. Traces of repair are apparent, and the wooden handle is in relatively poor condition. The handle was discovered in direct association with W 03221, a decorated wooden knife sheath.

W 03221
Wooden Knife Sheath. Plate 35
Found: ÖB, SB, Beam 5, 1100 cm from forward
Associated with: Adam
Length: 22.5 cm
Width: 3.5 cm

These five fragments of a wooden knife sheath were found in association with knife handle W 03222, adjacent to Adam's bones. Each fragment contains a hollowed out back. The sheath has two 2.5 cm wide beveled grooves. One is located 2.0 cm from the sheath's base, and one is located 6.0 cm from the tip. This sheath would have been fastened to the sailor's belt or baldric.

After piecing the fragments together, several markings, known as *bomärker* in Swedish, became evident between the two bevels. *Bomärker* occur on several objects in the *Vasa* collection, including casks, boxes, wooden tankards, plates, and spoons. These markings most likely denote ownership of the object, making them house-marks or holdings-marks. House-marks and holdings-marks first became popular amongst the peasants of Medieval Europe and remained popular until most people could write. They were used to claim familial (household) or personal possession of "all moveable property" (Koch 1955:76). Since these marking were often used in lieu of a signature in a period of limited literacy, they had to be easy to score in wood or cut in stone and simple to identify (Bühler-Oppenheim1971:47). All of the marking on this sheath appear to have been roughly carved out with a knife, possibly the knife that fits inside the sheath. Vasamuseet staff members have only photographed the most visible (least eroded) and identifiable marks.

The wooden knife sheath features three styles of markings: letters, geometric shapes, and a curvilinear form. The letters LIS, DEN, HMS, U, B, MS, and FN are all carved onto the exterior of the sheath. LIS and HMS are particularly discernable (Figure 38 and Figure 39). While most people, as previously suggested, were not literate during the seventeenth century, they may have been able to write their initials. One of these letter combinations may, thus, represent Adam's real initials. The presence of multiple letter combinations may indicate reuse, or perhaps they are merely doodles carved by a bored sailor.

Figure 38: LIS personal marking on the wooden knife sheath, W 03221, Courtesy of Vasamuseet.

Figure 39: HMS personal markings on the wooden knife sheath, W 03221, Courtesy of Vasamuseet.

Geometrically, the sheath features a heart with a cross on top of it and a heart with a cross on top of it and inside it (Figure 40). The heart symbol dates back to before Europe's last Ice Age, to the European Upper Paleolithic. It likely began as a sign for the physical heart of men or animals, and it has ultimately become a conventional sign for togetherness or love. In this case, considering its association with crosses (standard Christian markings), the heart symbol may have religious significance. In the Christian trilogy of faith, the heart symbol stands for charity (Liungman 1995:239-240). These markings may have, consequently, served as reminders or symbols of the owner's faith.

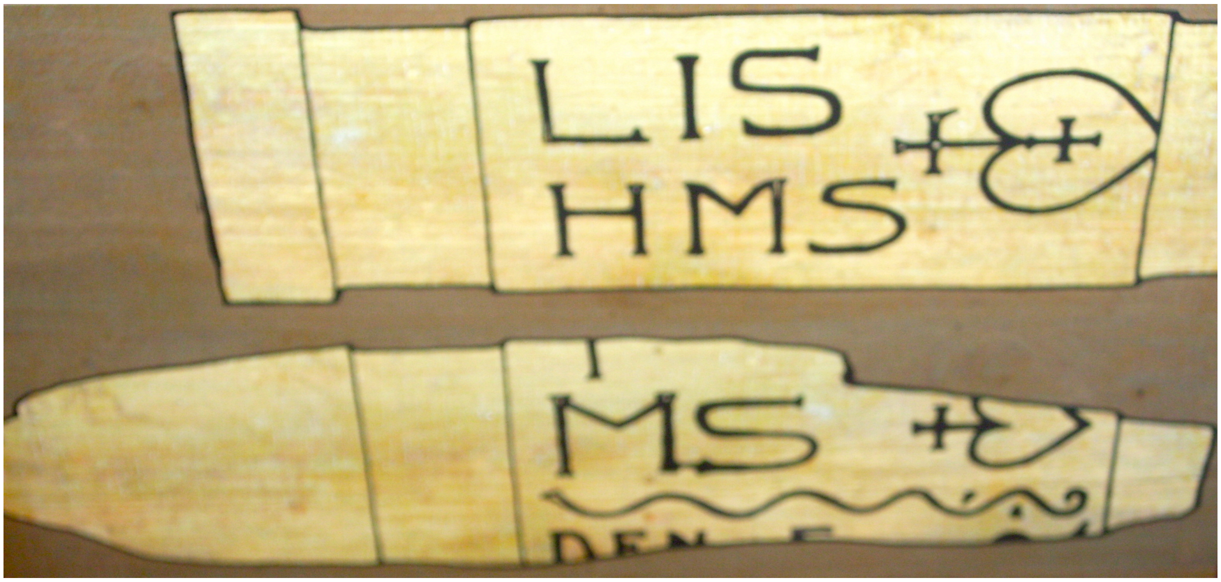


Figure 40. Drawing of various personal markings on the wooden knife sheath, W 03221, Courtesy of Vasamuseet.

In addition to the aforementioned markings, a wavy line is also engraved on the external portion of the sheath (Figure 41). This is a common sign for water or the sea (Liungman 1995:102), so it is not surprising that this symbol is on a sailor's knife sheath. In this instance, however, it appears more likely that the wavy line is merely a decorative divider between other markings (Figure 40). More information on the markings will be forthcoming from Irene Lindblom, collection manager at the Vasamuseet, who is conducting a detailed study of the *bomärker*.

Figure 41. Wave marking on the wooden knife sheath, W 03221, Courtesy of Vasamuseet.

W 03259
Wooden Spoon. Plate 36
Found: ÖB, BB, Beams 5-6, 1100 cm from forward
Associated with: Beata
Length: 7.4 cm
Width: 4.0 cm

This broken wooden spoon was found in the same general location as Beata's bones. The spoon is made of either softwood or larch, and according to current projections, it would have been relatively large. It is extremely worn and has a broken handle. The top edge and one long side of the spoon bowl are also broken. In its current state, the bowl is 5.3 cm long and 4.0 cm wide, and it gradually decreases in thickness from 1.0 cm at the handle to 0.3 cm at the spoon end. The underside of the bowl is ridge shaped. The handle is narrow with an oval cross section. The handle cross section has a large diameter of 1.0 cm and a small diameter of 0.8 cm, and the handle is 2.3 cm long.

W 04276
Wooden Knife Handle. Plate 37
Found: ÖB, MS, Beams 5-6, 1100 cm from forward
Associated with: Beata
Length: 7.4 cm

Width: 2.2 cm

This characterless knife handle was discovered between the upper and lower gundecks in the same area as Beata. The oblong shaped wooden handle with an oval cross section has a maximum diameter of 1.5 cm. Similar to Adam's knife handle, it is slightly curved in shape. While it tapers at one end, the other end is flattened off. The flat end contains an oval hole, where the unpreserved knife tang would have been located. The hole is 1.4 cm long and 0.5 cm wide. Besides a small crack on one end, the handle is well preserved.

W 03244
Six Wooden Spoon Fragments. Plate 38
Found: ÖB, SB, Beam 4, 900 cm from forward
Associated with: Cesar
Overall Length: 16.2 cm

Made of either alder or beech wood, this fragmentary spoon was found in the same general location as Cesar's bones. The six fragments include the handle with the base of the spoon bowl and five pieces of the bowl. The 8.9 cm long handle is straight and flat (0.6 cm thick) and has a decorative carved outline. The carving's width ranges from 1.7 cm to 1.0 cm, but it is chipped in two places. It is made up of a combination of geometric shapes—diamonds and triangles. The carving may just be ornamental, or the sailor may have carved the handle as a way of quickly identifying which spoon was his. Upon combining the five bowl fragments, the spoon appears to have an oval shaped bowl that was originally 7.3 cm long. Width could not be determined. The thickness of the bowl gradually decreases from 1.1 cm at the handle to 0.7 cm at its end. The spoon is very fragile with minor cracking and has traces of yellow paint.

W 07642
Two Fragments of a Wooden Spoon Bowl. Plate 39
Found: ÖB, SB, Beams 14-15, 2490-2720 cm from forward
Associated with: David
Length Fragment 1: 5.5 cm
Width Fragment 1: 3.5 cm

Length Fragment 2: 4.7 cm
Width Fragment 2: 1.8 cm

Though cracked and in poor condition, these two fragments clearly represent a spoon's bowl made of beech wood. They were found with David's bones. The fragments are both 0.4 cm thick. The spoon bowl was originally oval-shaped, with a long diameter of approximately 7.2 cm and a short diameter of roughly 5.8 cm. There are no personal markings on the two fragments.

W 07648
Wooden Spoon. Plate 40
Found: ÖB, SB, Beams 14-15, 2490-2720 cm from forward
Associated with: David
Overall Length: 19.4 cm

This wooden spoon is broken into two parts. It was found in the same area as David's bones, between 2490 and 2720 cm from the inner face of the stem on the starboard side of the upper gundeck. The spoon bowl is currently damaged, but it was probably round. It is 7.9 cm long, 5.3 cm wide, and slightly ridged near the handle. The handle is 11.5 cm long and tapers to the spoon bowl. While the base of the 0.9 cm thick handle has a circular cross section, the handle is slightly beveled near the bowl. The spoon's underside has traces of a red-brown paint.

W 07645
Wooden Knife Handle. Plate 41
Found: ÖB, SB, Beams 14-15, 2490-2720 cm from forward
Associated with: David
Length: 9.6 cm
Width: 2.5 cm

Found in the same area as David's bones, the wooden knife handle is cylinder shaped. It has an oval cross section with a long diameter of 2.5 cm and a short diameter of 2.2 cm. In the center at one end, there is a rectangular hole for the tang. The hole has a length of 1.3 cm and a height of 0.8 cm. The handle is worn and has several cracks. There are also traces of mending at one end.

W 07636
Fork Handle. Plate 42
Found: ÖB, SB, Beams 14-15, 2490-2720 cm from forward
Associated with: David
Length: 10.0 cm
Maximum Diameter: 1.9 cm

Made of the high class, expensive pear wood, this handle is a unique find. It was discovered near David. Researchers are still uncertain whether this is actually a fork, given that the metal blade portion did not survive. They seem to label it as a fork because it is more elaborate than most spoons found aboard. Only the central portion of the handle, 5.6 cm, is carved from pear wood. The handle top is adorned with a circular knob of bone, capped with a round piece of brass. The bone knob, which has a 1.9 cm diameter and is 2.9 cm long, is decorated with horizontal, carved stripes. The handle is tapered, and a 1.5 cm long brass casing encloses the end. The bottom of the handle contains a slot for the metal blade. The fork handle is relatively well preserved; it has a few visible cracks and is missing a single splinter of wood.

W 18429
Wooden Spoon Bowl. Plate 43
Found: TD, BB, Beams 16-18, 2819-2976 cm from forward
Associated with: Erik
Length: 4.9 cm
Width: 3.2 cm

This spoon bowl was found in the same area as Erik's upper midsection. The bowl, which is broken along the upper edge, was probably oval-shaped. Presently, it is 4.0 cm long, 3.2 cm wide, and 0.2 cm thick. Approximately 0.5 cm of the bowl is missing. There is evidence of repair by the original conservation unit along the bowl's left side. A small length, 0.9 cm, of the spoon handle is preserved. The handle is 1.3 cm wide and 0.6 cm thick. There are no traces of paint or personal markings visible on the spoon.

W 10268
Fragment of a Wooden Spoon Bowl. Plate 44
Found: ÖB, SB, Beams 22-24, 3710-3930 cm from forward
Associated with: Filip
Length: 9.2 cm
Width: 3.0 cm

Though extremely worn, this fragment of wood appears to be a spoon bowl's right half. The original, carved curvature is still visible. The beech wood fragment ranges in thickness from 0.3 cm to 0.8 cm. It was found with Filip's bones.

W 10124
Wooden Knife Handle. No Plate Available
Found: ÖB, SB, Beams 22-24, 3710-3930 cm from forward
Associated with: Filip
Length: 9.0 cm
Width: 2.4 cm

This elongated knife handle was found in the same general location as Filip's bones. It has an oval cross section with a long diameter of 2.4 cm and a short diameter of 1.9 cm. It is broken at one end, so the notch for the tang is not visible. The broken end has a visible red color, while the other end has a blue-grey coloring. The rectangular shaped handle is in fair condition.

W 10253
Wooden Knife Handle. Plate 45
Found: ÖB, SB, Beams 22-24, 3710-3930 cm from forward
Associated with: Filip
Length: 8.5 cm
Maximum Width: 2.3 cm

Found in close proximity to W 10252, a knife sheath, this knife handle is composed of two halves. The halves were found near Filip's bones. Each half has a curved outer surface and a flat inner surface. One end is curved with a width of 2.3 cm; the other is squared off and 1.2 cm wide. The 0.6 cm thick halves each have three holes, the original location of three rivets.

The top two holes are 2.5 cm apart, while the two bottom holes are 3 cm apart. One half of the knife handle has a reddish-brown stain, which may be paint or iron residue.

W 10252
Wooden Knife Sheath. Plate 46
Found: ÖB, SB, Beams 22-24, 3710-3930 cm from forward
Associated with: Filip
Length: 20.0 cm
Maximum Width: 2.4 cm

This knife sheath was found in connection with Filip's bones and in close association to W 10253, a knife handle. It is broken into six pieces. Each piece is thin and long with a hollow back. The knife sheath's full length cannot be determined, but it is approximately 3.5 cm wide. There are four visible bevels or grooves along the sheath's length. The first one is 0.5 cm wide and 3.0 cm from the sheath's top. The second groove is 0.3 cm wide and located 5.2 cm from the top edge. The third 1.0 cm wide groove is centered 10.5 cm from the top edge. The fourth groove, similar to the first, is 0.5 cm wide. It is approximately 19.5 cm from the sheath's top. The size and distance variations between grooves suggest that the owner carved the decorations. According to maritime archaeologist Fred Hocker (2014 pers. comm.), the grooves are for the cord or wire which originally fastened the parts of the sheath together. Two squares and one semicircular hole are also present on the top edge.

W 01473
Decorative Bone Pommel. Plate 47
Found: UB, BB, Beams 13-14, 2197-2453 cm from forward
Associated with: Helge
Length: 2.7 cm
Width: 1.8 cm

Found inside Helge's pants pocket, this bulb shaped bone artifact represents the decorative end of a wooden knife handle. The original handle would have looked similar to

Adam's knife handle. The bone pommel is 1.5 cm thick and has an approximately 0.2 cm diameter hole in its center, where the bone knob was fastened to the handle.

W 14310
Leather Knife Sheath. Plate 48
Found: UB, BB, Beams 13-14, 2197-2453 cm from forward
Associated with: Helge
Length: 16.8 cm
Width: 2.7 cm

This leather knife sheath was also found in Helge's pants pocket. It consists of two rolled layers of nappa, or full-grain, leather. The outer layer is sewn together with visible stitching. The outer layer's base is tucked in and sewed shut, forming a point. The inner layer is also sewn closed. This is evident where the outer layer is missing. Both layers have visible cracking. The maximum width of the sheath is 2.5 cm, while the minimum width is 1.0 cm.

W 04238 and W 14294
Wooden Knife Handle. No Plate Available
Found: UB, MS, Beams 13-14, 2200-2400 cm from forward
Associated with: Ludwig
Length: 9.3 cm
Width: 2.4 cm

Each find number represents a portion of a 9.3 cm long wooden knife handle. The two pieces were found in the same general location as Ludwig's bones. The break is not vertical. One fragment is 5.7 cm long, and the other fragment is 3.9 cm long. The handle has a circular cross section with a 2.4 cm diameter. The handle's broken end has a round hole with a 1.3 diameter. This is where the end of the blade, the tang, would have been inserted.

HYGIENE MATERIALS

Since prehistoric times, humans have fashioned tools for the purpose of styling their hair. Humans made early styling tools of wood, tortoise shells, antlers, ivory, and bone. The earliest examples date back to the Stone Ages. All major civilizations, including Ancient Egypt, Greece, and Rome had combs. Moreover, during the Viking Age important comb making centers existed across Scandinavia (Sherrow 2006:97).

People employed combs made from ivory, bone, and wood throughout the Medieval Period. The combs had two sides. Medieval people used one side with finer teeth for cleaning and removing lice and their nits; they employed the other side of the comb with its wider spaced teeth to make their hair look more presentable. The wealthy often had elaborate carvings along their combs' centers, between the two rows of teeth. By the 1100s, comb-makers began forming guilds (Sherrow 2006:97-98).

Seventeenth-century Europeans continued to use the two-sided combs developed during the Medieval Period. As men began lengthening their hair and beards and wearing wigs, the comb's grooming section became more significant. Throughout the seventeenth century, comb makers made combs from wood, animal horns, ivory, bone, and tortoise (Sherrow 2006:88). W 14256 is an example of a two-sided, bone comb from *Vasa* (Figure 42). Comb makers made different forms for natural hair, wigs, and beards. By the end of the century, men kept combs in their pockets for easy access (Sherrow 2006:88).

ASSOCIATED HYGIENE MATERIAL ABOARD **VASA**

W 09018
Bone Comb Fragment. No Plate Available
Found: ÖB, BB, Beams 6-8, 1220-1490 cm from forward
Associated with: Beata
Length: 3.5 cm
Width: 2.0 cm

Found in association with Beata's bones, this comb fragment represents the only artifact related to hygiene found with *Vasa*'s human remains. The bone comb fragment still has visible teeth. It is a two-sided comb with finer teeth for removing parasites and wider spaced teeth for hairstyling.

Figure 42. A two-sided, bone comb, W 14256, Courtesy of Vasamuseet

COINAGE

As humans began to live in organized communities, a need for the exchange of goods and services arose, leading to the creation of formal systems of payment. Initially, people employed various objects, including shells, beads, rocks, and cloth, as forms of payment. As metallurgy took hold in Europe, people began to employ pieces of metal, especially gold, silver, and copper, as compensation. Originally shaped as bars, bands, and wires, the size and weight corresponded to the worth. Around 640-630 B.C., the first coins, a natural mixture of gold and silver, were struck in Lydia (Tingström 1969:9). The idea of coins spread rapidly across Southern Europe, and eventually, the coins reached Northern Europe.

The first coins to circulate in Sweden were Roman silver coins—*denarii*—imported during the middle of the second century A.D. As of 1960, archaeologists had uncovered approximately 6000 *denarii* across Sweden. Between A.D. 450 and 550, the *solidi*, a Roman gold coin, began appearing in Sweden. During the Viking Age, 800-A.D. 1000, Carlovingian, Arabian, German, and ultimately, English coins arrived. With such a variety of coins in circulation, weight determined the value. The first Swedish coins, modeled after English examples, were struck as the tenth century ended; Swedish King Olof Skötkonung had them made (Tingstöm 1969:10-11).

From the thirteenth until the eighteenth century, the Svealand coin reckoning system was used throughout the nation. Coins weighed 1.2 grams, and the standard unit was the mark, which was divided into *penning, öre*, and *örtug*. One 1.2-gram coin equaled one *penningar*; 192 *penningar* equaled one mark. A mark was equivalent to eight *öre* (32 *penningar*), and one *öre* amounted to three *örtug* (8 *penningar*). In 1604, the daler became the standard unit, but there was no coin worth one daler. It was divided into four mark, each of which was further divided into eight *öre*. A daler was, therefore, equal to 32 *öre*. This coinage system of reckoning lasted until 1776 (Tingström 1969:11-14).

Historically, Swedes employed silver, copper, and gold coins, not always simultaneously. The earliest Swedish coins were exclusively silver. Then, under Gustav Vasa, Erik XIV, and Johan III klippings (square coins that varied in silver content) were struck. In addition to partially silver coins, Erik XIV struck the first Swedish gold coins in 1568. During the reign of Gustav II Adolf, a copper mine in Falun, Sweden produced two-thirds of Europe’s copper. Not wanting to deflate the price of copper, the government started to mint copper coins. These allowed them to utilize excess metal, limit the amounts released to the European market, and increase demand. Produced primarily in Säter, the coins were released in large quantities from 1624 until 1627. Since silver coins were still in circulation, a parallel monetary system, consisting of both silver daler, mark, and *öre* and copper daler, mark, and *öre* was employed from 1624 until 1776 (Tangström 1969:11-15).

During the seventeenth century, manufacturers produced coins in two ways, via hammer embossing or the rolling mill method. Hammer embossing required an upper stamp and a lower stamp. Each stamp had a piece of metal on its inner edge, which had a negative of the coin's superimposed text. The striker placed the coin between the stamps and struck a hard blow with a mallet. After pulling apart the stamps, the finished square coin, or klipping, was released (Kaijser et al. 1982:36-37). Some mallets, or sledges, had the superimposed text on one end (Figure 43). The rolling mill method involved two rollers with negatives of the coin images. The minter placed a metal strip between two rollers. By turning the rollers, the strip was repetitively marked with the desired image (Figure 44). The minters then cut out each individual coin from the strip. Minters used the rolling mill method to make all round coins (Kaijser et al. 1982:36-37).

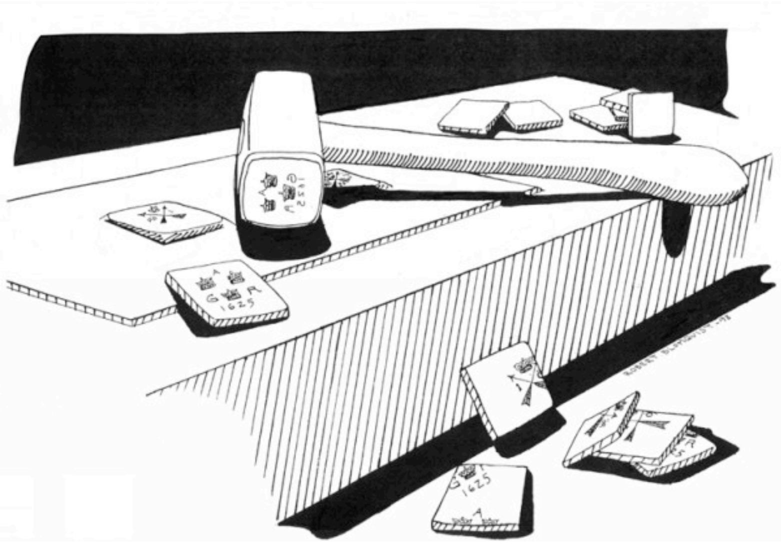


Figure 43. Equipment for hammer embossing, Courtesy of Vasamuseet.

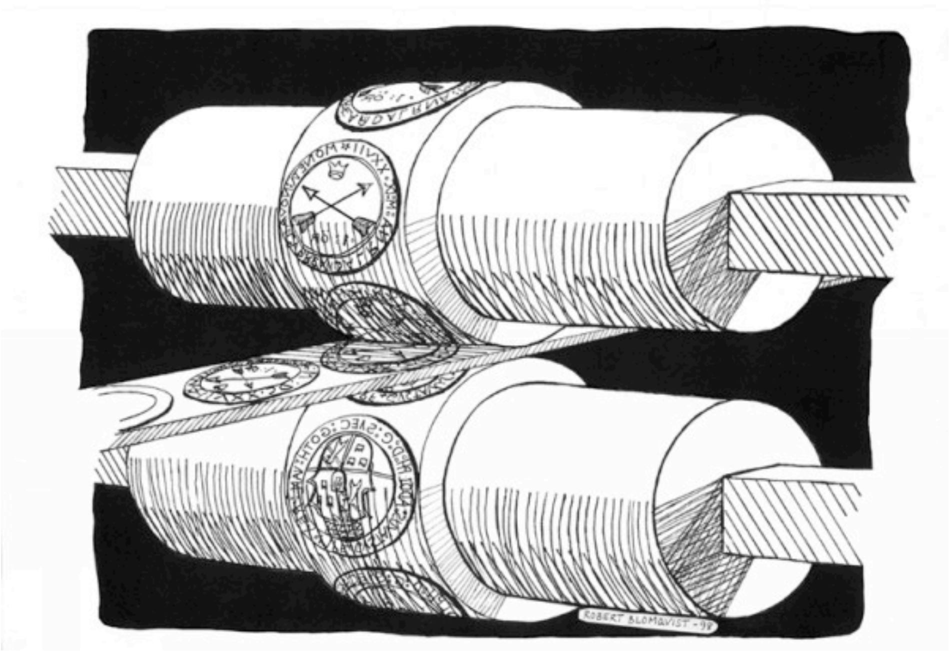


Figure 44. Equipment for rolling mill method, Courtesy of Vasamuseet.

ASSOCIATED COINAGE ABOARD VASA

The *Vasa* collection includes roughly 4000 coins, ranging in value from ¼ *öre* to 2 *öre*; a majority are copper. Only 46 coins are silver. Most coins date between 1624 and 1627 and were produced in Säter, Nyköping, or Arboga (Figure 45). While the mints of Säter and Nyköping employed both hammer embossing and the rolling mill, manufacturers in Arboga only used the rolling mill. The coins included both klippings and round coins.

All round coins have the Swedish national coat of arms on their obverse (Figure 46). The round Nyköping coins have the side view of a Griffin, with the value on the left and ÖR on the right, stamped on the reverse (Figure 47). Säter's round coins and klippings have two crossed arrows beneath a crown stamped on the reverse. The coin value is on the left and ÖR is on the right (Figure 48). Alternatively, Arboga's round coins and klippings have a front view of an eagle with widespread wings stamped on the reverse. The coin value and ÖR are printed beneath

Figure 45. Locations of seventeenth-century Swedish mints, Courtesy of Vasamuseet.

the eagle (Figure 49). The reverse of a Nyköping klipping has a Vasa Dynasty Sheaf with the coin value on the left and the ÖR on the right; its obverse has the letters GAR in a straight line (Figure 50). These letters stand for Gustavus Adolphus Rex (King Gustavus Adolphus). While the image on the obverse of the Säter and Arboga ½-*öre* klippings is the *vase*, the fascine used as the heraldic symbol of Gustav Adolf's family (Figure 51), the image on the obverse of the Säter and Arboga 1-*öre* klippings is a Swedish Emblem—three crowns forming an upside down triangle (Figure 52). Both images have a G to the left, an A above, and a R to the right. (Kaijser et al. 1982:44-55). There are few examples of coins that predate Gustav II Adolf.

Adam had 14 coins in his possession—12 round coins and two klippings. Seven coins came from Arboga and seven from Säter. Beata had one round coin from Säter. Archaeologists discovered 48 coins in the same general location as David, including 46 round coins and two klippings. Säter produced 33 of David's coins, Nyköping two, and Arboga 11. Two of David's coins predate 1624; one was dated 1565, the other 1611. Stockholm manufacturers produced both older coins. In addition to copper coins, David had two silver coins (W 07260 and W 07640).

Figure 46. Obverse of a round *öre*, W 08214, Courtesy of Vasamuseet.

Figure 47. Reverse of a round 1/2-*öre* from Nyköping, W 08214, Courtesy of Vasamuseet.

Figure 48. Reverse of a round *öre* from Säter, W 03217, Courtesy of Vasamuseet.

Figure 49. Reverse of a round *öre* from Arboga, W 00936, Courtesy of Vasamuseet.

Figure 50. Obverse (left) and reverse (right) of a 1-*öre* Nyköping klipping, W 04231, Courtesy of Vasamuseet.

Figure 51. Obverse of a 1/2-*öre* klipping from Säter, W 41626, Courtesy of Vasamuseet.

Figure 52. Obverse of a 1-*öre* klipping from Säter, W 40055, Courtesy of Vasamuseet.

Erik may have possessed up to 17 coins, including 12 round coins and five klippings. Two coins came from Arboga, 14 from Säter, and one from Nyköping. Filip had 10 coins—nine klippings and one round coin. All but one came from Säter. Helge had 33 coins, and Ylva had 24. Excavators originally found Helge and Ylva's coins inside leather pouches. Helge's coins included 10 round coins and 23 klippings, while Ylva's coins included one round coin and 23 klippings. Researchers found two Säter klippings near Johan and one round Säter coin near Ludwig. Due to the large quantity and overlapping appearance of *Vasa* coinage, individual images and descriptions are not included within this chapter. Instead, Appendix B has a complete listing of coins, including their descriptions.

KEYS

Safeguarding property using keys and locks dates back thousands of years before Christ. The oldest surviving example of a lock is Egyptian and is 2000 to 3000 years old. It is a wooden sliding lock on the gate to an apartment in the Palace of Khorsabad. The corresponding key is 10-20 inches long and heavy. It is a flat, wooden piece of wood with pegs on the end that correspond to holes in the lock. After securing the pegs in place and pushing or pulling the key, the bolt slides, unlocking the gate. The Romans and Greeks employed similar wooden locks and keys, but instead of pegs on the end of the key, their keys had engraved signets. Modern cylinder locks have their origins in these early wooden locks (Eras 1974:10,20-28).

Egyptians and Romans also employed iron and bronze locks and keys. These early metal keys could be turned or slid to open the locks. Few changes in design, construction, or finish occurred between the Roman Period and the Medieval Period. In fact, when placed side by side, it is difficult to differentiate a Roman key from a Medieval English key (Eras 1974:32-33,51).

Influenced by the Germans, Medieval locksmiths began constructing exquisite locks and keys with decorative designs. The bows, or top end, in particular became elaborate and ornamental (Eras 1974:51-58).

Since the key determines the lock's design, it is always constructed first. No matter the material, a key is designed to prevent the lock's illegitimate opening. To achieve security, locksmiths designed extremely complex key bits and incorporated numerous obstructions in and around the keyhole. During the seventeenth century, people employed iron locks and keys on gates, doors, barrels, chests, furniture, and cupboards (Eras 1974:54-59). Keys would have been carried on the individual for security purposes. The *Vasa* contained several personal chests with locking mechanisms.

A typical seventeenth-century turn key lock had one, two, or three bolts—the sliding pieces of a lock. A bolt had two parts: the head and the tail. The head, which was thick and solidly constructed, was guided by a hole in the lock's front. Studs riveted to the lock case supported the thinner tail, which had notches on its bottom and top. When the key was inserted into the keyhole, the bit engaged the bottom notch, called a talon. Turning the key caused the bolt to slide, either throwing or withdrawing. The bolt would not move, however, until the spring loaded pin tumbler, which coincided with the top notch, was lifted by a second turn of the key (Eras 1974:96).

ASSOCIATED KEYS ABOARD **VASA**

W 23071
Iron Key. Plate 49
Found: Outside *Vasa*, Aft
Associated with: Ylva
Length: 6.5 cm
Width: 2.3 cm

This is the only key found in or around *Vasa*. It was found outside the vessel near a pair of leather shoes (W 23069 and W 23670), which contained Ylva's feet. The iron key has a round key shaft forged to a bit with at least two steps. The shaft height with the steps is 1.1 cm, and the diameter of the remaining shaft is 0.6 cm. The bow is a circular loop with an inner diameter of 1.7 cm and an outer diameter of 1.95 cm. At the transition between bow and shaft, there is a 0.25 cm wide collar. A collar of the same width is located at the end of the shaft, beyond the bit. Since Ylva was likely a passenger aboard for the maiden voyage, the key was not linked to a particular type of locking mechanism. The key may very well unlock a door or container that was never aboard *Vasa*.

LANTERNS

In the Dordogne, archaeologists have unearthed oil lamps made from stone that date back 15,000 years to the late Paleolithic period. Researchers have also uncovered early seashell and earthenware lamps. By Graeco-Roman times, pottery oil lamps lit the average home. People continued to regularly employ oil lamps until the general adoption of electricity in the late nineteenth century (O'Dea 1958:28-29,38,56).

Romans developed the first candle in at least the first century A.D. During that century, a contemporary Roman citizen, Pliny the Younger, described a candle made from threads of flax and coated in pitch. The candle remained inferior to the lamp until the end of the medieval period. By the end of the twelfth century, citizens of England commonly used tallow candles. During the seventeenth century, people preferred wax candles, but only the wealthy and the church could afford them. The average peasant still lit his house with the fast burning tallow candle (O'Dea 1958:33-37,43).

The lantern dates to antiquity. Classical archaeologists discovered the earliest example, a bronze horn lantern, in the volcanic mud of Herculaneum. The historic lantern consisted of a central-wick oil lamp surrounded by a horn cylinder. Britain's King Alfred may have reintroduced the horn lantern during the ninth century. They were common by the thirteenth century, when producers formed a guild in France (O'Dea 1958:70-72).

Artisans made lanterns of cow or bull horns and wood until the eighteenth century. During the eighteenth century, tin replaced wood. To make 'windows' for horn lanterns, producers submerged the horn for four to six weeks to soften the connection between the horn and core. Then, they removed the core. After soaking the hollow horn in boiling water, it was held over a flame until it became extremely malleable. At this point, the horn was cut in half and the individual lamina separated using a round pointed knife. The manufacturers, then, scraped the lamina to a desired thickness, polished them, and rubbed them with rottenstone and horn shavings. Horn was cheap, pliable, and practically non-flammable. Lantern manufacturers inserted the horn 'windows' between wooden slats attached to a wooden base. A wooden top sealed the horn 'window' and wooden slats into place. Either an oil lamp or a candle served as the light source. Glass windows ultimately replaced the horn 'windows' (O'Dea 1958:71-74). A horn lantern is pictured in the background of Jan Steen's seventeenth-century painting "A Goldsmith Melts the Jewelry of His Wife" (Figure 53).

Lanterns were a necessity aboard ships in the seventeenth century. During nice sunny days, sailors on the upper deck and gundecks could have relied more on natural lighting. Exceptions would include the dark corners of the gundecks, where sunlight did not reach. Little, if any, natural lighting existed below the gundecks, so the sailors on these decks employed lanterns whenever light was needed. During the nighttime, sailors on every deck would require lanterns. Seventeenth century sailors would have preferred horn lanterns on wooden ships, as they were, again, non-flammable.

Figure 53. Jan Steen, "A Goldsmith Melts the Jewelry of His Wife," Städel Museum, Frankfurt, Germany © Städel Museum – ARTOTHEK.

ASSOCIATED LANTERNS ABOARD VASA

W 10690
Wooden Top of a Lantern. Plate 50
Found: TD, SB, Beam 2, 519 cm from forward
Associated with: Ivar
Diameter: 20.5 cm
Thickness: 6.0 cm

W 10690, the wooden hood of a horn lantern, was found in the same confined space as Ivar on the orlop. It is round, with a top hat like shape. The 15.8 cm wide upper portion of the hood has a 4.1 cm diameter hole in the middle and two pairs of small holes along the outer edge. The lower section has four 1.0 diameter holes evenly spaced around its perimeter. The hood's interior has burn marks from a candle. This charring may have occurred when the ship heeled over during wrecking.

W 17671, W 17672, and W 17668
Wooden Lantern Base, Top, and Slat. Plate 51
Found: HS, SB, Beams 6-7, 1137-1296 cm from forward
Associated with: Johan
Base Diameter: 25.0 cm
Base Thickness: 1.0 cm
Top Diameter: 22.0 cm
Top Thickness: 5.0 cm

All lanterns found aboard *Vasa* have a wooden base where the burning candle was placed. This wooden base was found in the same general location as Johan's arm and leg bones. Four holes, where the lantern's upper portions would have been inserted, are located at the base's center. The wooden lantern base was found in close association to W 11672, a lantern top fragment, and W 17668, the a wooden lantern slat. These wooden artifacts have since been misplaced, so construction details are not unavailable. If combined, the three pieces would make up about two-thirds of a horn lantern. A number of lanterns were found in the hull, suggesting extras were stored in the hull. Yet, this is the only one found in the general location of Johan's skeletal remains. Thus, it is quite possible that Johan was carrying this lamp as he was descending down into the hold. There is not way to know for sure, however.

SMOKING PARAPHERNALIA

For recreation, among other activities, seventeenth-century Europeans read books, gambled, played outdoor games, hunted, smoked, and conversed with one another. On board a ship, however, men were limited by space, time, and weather. Seamen participated in four principle forms of entertainment during the late sixteenth and early seventeenth centuries: playing games, talking amongst themselves, singing songs, and reading books (Pérez-Mallaína 1998:154-155). Though not immensely popular until the late seventeenth century, pipes were smoked during the early seventeenth century. Archaeologists uncovered evidence of both smoking and reading aboard *Vasa*.

Europeans believed tobacco was an "expensive herbal medicine" until the end of the sixteenth century (Goodman 1993:131). Before the sixteenth century, only Spain and Portugal had access to the New World's tobacco supply. Regular commerce in tobacco did not exist until after 1590 because commercial interests revolved around gold and silver. In 1590, explorers and adventures gained an interest in other commodities, including tobacco. The long distance trade of exotic commodities, including tobacco, grew throughout Europe (Goodman 1993:131-133).

In 1612, John Rolfe grew the first tobacco crop in the New World for export purposes. He legally exported his crop from Virginia to England. The tobacco fetched a high price in Europe. The ability to grow tobacco soon spread to Europeans across Virginia, South America, the English West Indies, and Bermuda. In 1628, Virginia exported 370,000 pounds of tobacco, as opposed to 170 pounds in 1614. Though governments in Central and South America considered tobacco contraband, they shipped 200,000 pounds to Europe annually during the early seventeenth century. By 1623, Amazonian settlements alone supplied Europe with roughly 800,000 pounds of tobacco. Bermuda supplied Europe with 184,000 pounds in 1628. With a combined population of 40,000, the English West Indies, Bermuda, and Virginia shipped 1,250,000 pounds to Europe in 1640 alone (Goodman 1993:135-140).

Tobacco use soon spread to Europe. The Dutch began cultivating tobacco around 1610, and by 1675, they produced 5 to 6 million pounds of tobacco annually. The demand for tobacco increased across the century. Chesapeake Bay, Brazil, Holland, and Germany dominated the tobacco trade by the eighteenth century. As the supply of tobacco increased, the English and Dutch had to find new markets in Europe. They turned to Scandinavia. By the early eighteenth century, the Dutch exported fifteen million pounds of tobacco to Northern Europe annually. The Dutch had great success exporting tobacco to Sweden. By the end of the eighteenth century, the Swedish market collapsed because the Swedes began cultivating their own crop (Goodman 1993:142-144,154-155).

Pictorial evidence suggests widespread tobacco use throughout Europe. Tobacco was a luxury item during the early seventeenth century, but, as the price of tobacco decreased, consumption expanded. Men, women, and children regularly smoked tobacco by the late seventeenth century. As early as 1750, at least 25 percent of the adult European population consumed a pipe of tobacco at least once a day (Goodman 1993:60-64). Northern Europeans preferred to smoke tobacco in pipes. Adriane Brower clearly illustrated a man smoking an early clay pipe in his 1636 oil painting called “The Smokers” (Figure 54).

Figure 54. Adriaen Brouwer, "The Smokers, " ca. 1636 © Metropolitan Museum of Art / Art Resource, NY.

The production of clay smoking pipes began in London right after the introduction of tobacco, around 1558. According to Eric Ayto (1994:4), the earliest written description of an English clay pipe was in 1573. All pipes found outside London during from this early period until about 1640 were London made (Goodman 1993:64). By 1580, the bowls of pipes were barrel-shaped with a forward incline at an obtuse angle, and had an inside diameter of approximately 0.60 cm. Moreover, the base of the bowl was flat, the stem was relatively straight, and the stem ranged from 10 to 15 cm long (Ayto 1994:4). In 1619, at least 62 London artisans specialized in making pipes. They relied on clay imported from Kent, the Isle of Wight, and Dorset (Oswald 1975:6-8,11,42).

By 1640 the bowl inside diameter had increased by about 0.35 cm and there was no noticeable increase in stem length. Ayto (1994:4) attributes this size variation to the decrease in tobacco prices and increase in tobacco availability. After 1640, the pipe bowl inside diameter continued to grow larger, as did the stem. By 1700, the bowl had become more elongated, and its inside diameter increased to about 1.3 cm. This size difference is quite visible when comparing pipes from before and after 1700. The flat heel also gradually fell out of favor after 1640. A pointed spur replaced the flat heel, becoming the standard until 1700 when the flat heel regained favor again. Finally, milled or plain rings around the rim of the bowl and sometimes maker's marks began appearing in the 1640s. Generally, however, seventeenth-century pipes were undecorated, or plain (Ayto 1994:4). There were several examples of clay pipes with milled or plain rings around the rim of the bowl found during the excavations of *Vasa.* W 05940 is an excellent example (Figure 55). This clay pipe, likely trash from late-seventeenth-century salvage divers, was found outside the ship, near the stern. It also demonstrates the persistence of the flat heel.

Figure 55: Clay pipe with a milled ring decoration around its rim, W 05940, Courtesy of Vasamuseet.

Some researchers have used pipe stem diameters to date pipes, but this method has fallen out of favor in recent years. According to J.C. Harrington, early seventeenth-century English pipes had thin, light stems that were 6 to 8 inches (15.24 to 20.32 cm) long. Thicknesses and lengths gradually increased across the century. While from 1620 to 1650, bore diameters ranged from 7/64 to 9/64 of an inch (0.28 to 0.36 cm), from 1750 to 1800, bore diameters ranged from 4/64 to 6/64 of an inch (0.16 to 0.24 cm) (1978:63-65). According to Lewis R. Binford's regression formula, the mean pipe stem diameter in 1628 was 8/64 of an inch (0.32 cm) (Binford 1978:66), but this again is highly debated. Harrington's clay pipe chronologies need to be revisited.

Pipe manufacturing spread from England to Germany, Scotland, France, and most importantly Holland. The Dutch began widely exporting clay pipes to Sweden in the mid- to late-seventeenth century (Goodman 1993:65). The key difference between English and Dutch pipes is the direction of striations inside the bowl. English bowls have vertical striations, while Dutch bowls have horizontal striations (Oswald 1975:17-18). The Dutch typically produced pipes with shorter stems and thinner bore diameters (Harrington 1978:64). Scandinavians used both Dutch and English pipes, but given the date of *Vasa,* any pipes belonging to crewmembers or passengers would have come from England.

ASSOCIATED SMOKING PARAPHERNALIA ABOARD **VASA**

W 08945
Three Clay Pipe Fragments. Plate 52
Found: ÖB, SB, Beams 5-6, 1070-1220 cm from forward
Associated with: Adam
Length of A: 9.4 cm
Length of B: 4.7 cm

This clay pipe consists of two stem pieces and the base of a bowl. As opposed to the typical light tan-white color of most pipes, this pipe is dark brown in some areas. This may be a sign of use. The two stems have external diameters of 0.8 cm and bore diameters of 0.3 cm. The inside diameter of the bowl could not be calculated because the bowl is too fractured. All three pipe fragments were in the same general location as Adam's bones. They cannot be definitively dated at this time.

W 09019
Seven Clay Pipe Stems. No Plate Available
Found: ÖB, BB, Beams 6-8, 1220-1490 cm from forward
Associated with: Beata
Length of A: 4.5 cm
Length of B: 4.0 cm
Length of C: 9.0 cm
Length of D: 7.5 cm
Length of E: 5.0 cm
Length of F: 3.0 cm
Length of G: 3.0 cm

These clay pipe stems were found near Beata's midriff. Pipe stems broke easily. The more the sailors smoked, the larger the quantity of discarded stems. Since early pipe stems were generally 15 to 20 cm long, these seven stems probably came from two or more pipes. The stems' outer diameters range from 0.5 cm to 1.0 cm. These stems cannot be definitively dated.

W 03245
Clay Pipe Stem and Bowl. Plate 53
Found: ÖB, SB, Beam 4, 900 cm from forward
Associated with: Cesar
Length of Stem: 9.7 cm
Length of Bowl: 3.7 cm

This clay pipe consists of a nearly complete bowl with no burn marks and a single stem piece. The two fragments were found in association with Cesar's hand bones. The bowl's outer diameter is 1.7 cm, and its inside diameter is about 1.0 cm. It has a roulette decoration, or a milled ring, along the rim. The ornamentation resembles the Roman numeral two (II) repeating. The stem has a smooth surface, a 0.3 cm bore diameter, and an outer diameter of 0.8 cm. The decoration and inside bowl diameter are consistent with pipes dating between 1640 and 1700 (Ayto 1994:4), suggesting this pipe postdates the wreck. It could represent trash from the late-seventeenth-century salvage divers.

W 09324
Decorated Clay Pipe Stem and Bowl. Plate 54
Found: ÖB, BB, Beams 8-9, 1490-1630 cm from forward
Associated with: Cesar
Length of Stem: 5.0 cm
Length of Bowl: 4.4 cm

Found between beams 8 and 9 on the port side of the upper gundeck, these clay pipe fragments are associated with Cesar's remains. The intact bowl has an outside diameter of 1.9 cm, an inside diameter of 1.3 cm, and a milled ring decoration along the top rim. The decoration, again, resembles the Roman numeral two repeating. The decoration and inside bowl diameter are consistent with pipes dating between 1640 and 1700, if not later (Ayto 1994:4). This means the clay pipe postdates the wreck and may represent trash from the late-seventeenth-century salvage divers.

The bowl's inside is black, suggesting use. With a 0.3 cm bore diameter and an outer diameter of 0.8 cm, the stem resembles those found with Adam and Cesar. This is the mean pipe size on *Vasa*. Unlike the two stems found with Adam, however, this stem has incuse markings along one end. The decoration consists of a row of dots repeating and a row of figure eights with dots inside each loop repeating. This pattern is not unique to this particular stem; W 11698 has the same roulette pattern.

W 07617
Fractured Clay Pipe Bowl. Plate 55
Found: ÖB, SB, Beams 14-15, 2490-2720 cm from forward
Associated with: David
Length: 3.5 cm

Encountered in connection with David's bones, this pipe bowl has an outer diameter of 1.5 cm and an inside diameter of 0.9 cm. According to Ayto (1994:4), this diameter size is popular after the 1640s. Similar to the W09324 and W08945 pipe fragments, this clay pipe bowl is black inside and along the rim. This may be the result of use. It has no other unique features.

W 07632
Four Clay Pipe Stems and Two Broken Bowls. Plate 56 and Plate 57
Found: ÖB, SB, Beams 14-15, 2490-2720 cm from forward
Associated with: David
Length of Stem A: 7.8 cm
Length of Stem B: 5.4 cm
Length of Stem C: 3.6 cm
Length of Stem D: 3.4 cm
Length of Bowl A: 4.5 cm
Length of Bowl B: 2.0 cm

Archaeologists found these six fragments in the same general location as David's bones. The two bowls are badly broken, so their bowl diameters cannot be determined. The pipe stems vary in size. Pipe stem A has a 0.3 cm bore diameter and an outer diameter of 0.8 cm, while pipe stem B has a 0.3 cm bore diameter and an outer diameter of 1.0 cm. Pipe stem C's bore diameter is 0.3 cm, and its outer diameter is 0.9 cm. Pipe stem D maintains a 0.3 cm bore diameter and an outer diameter of 0.5 cm. Pipe stem B has the carved Roman numeral two (II), the milled ring, decoration on both ends. One end has a single row of the decoration, while the other end has four rows. These pieces cannot be definitively dated at this time. The milled ring decoration on the stem is interesting, however. If similar patterns were found on the two bowls, the pipes would have been dated to after the 1640s.

W 07649
Lid to a Bentwood Box. Plate 58
Found: ÖB, SB, Beams 14-15, 2490-2720 cm from forward
Associated with: David
Long diameter: 5.0 cm
Short diameter: 4.5 cm
Thickness: 0.4 cm

This small wooden lid was found in connection to David's bones. Its small size is an indication that it could have easily fit into a sailor's pocket or pouch. Other small bentwood boxes found aboard *Vasa* contained items for repairing shoes, tacks, rope, and other small personal items. This particular box may have originally contained tobacco.

W 11533
Three Clay Pipe Stems and a Bowl. Plate 59 and Plate 60
Found: UB, SB, Beams 18-19, 3111-3266 cm from forward
Associated with: Erik
Length of Stem A: 3.5 cm
Length of Stem B: 3.3 cm
Length of Stem C: 2.4 cm
Length of Bowl: 3.8 cm

These four pieces were found in the general location of Erik's midriff. The three stem pieces are extremely fragmentary. They all have exterior diameters of 0.8 cm and 0.2 cm bore diameters. With these small bore diameters, Jean Carl Harrington (1978:64) would have dated these stems between 1680 and 1710, but as previously mentioned, these dates are unreliable. Given their close proximity to Erik and location—underneath one of the hatches on the upper gundeck—they could easily be from later salvage divers.

This bowl has evidence of burning inside and along the rim, suggesting use. It has an outer diameter of 2.2 cm and an inner diameter of 1.6 cm. An incuse mark, which resembles a decorated vase, is located on the bowl's exterior. The incuse mark covers an area of approximately 0.65 cm^2. This mark likely represents a maker's mark, which would mean this bowl probably postdates 1640 and the *Vasa* (Ayok 1994:4).

W 10291
Clay Pipe Stem. No Plate Available
Found: ÖB, SB, Beams 22-24, 3710-3930 cm from forward
Associated with: Filip
Length: 9.0 cm

Found in the same general location as Filip's knife sheath and handle, this pipe shank may also belong to Filip. The stem cannot be accurately dated. It has a diameter of 1.0 cm, and there are no unique markings on the fragment.

W 19531
Clay Pipe Fragment. No Plate Available
Found: TD, BB, Beams 1-2, 370-519 cm from forward
Associated with: Ivar
Length: 5.0 cm

While this find was found in the same confined space as Ivar in 1961, it has subsequently been misplaced over the past 50 years. Original notes state that it is a broken clay pipe with a height of 3.5 cm. The length and height suggest that it was probably a bowl fragment.

W 04244
Clay Pipe Stem Fragment. Plate 61
Found: UB, MS, Beams 13-14, 2197-2453 cm from forward
Associated with: Ludwig
Length: 5.8 cm

This is a smooth, undecorated pipe stem, which was found in the same general location as Ludwig's arm bones. This pipe stem has a diameter of 1.0 cm and a 0.3 cm bore diameter. Without a bowl fragment, it cannot be easily dated.

W 11693
Two Clay Pipe Stem Fragments. Plate 62
Found: HS, MS, Beams 12-13, 2075-2453 cm from forward
Associated with: Ludwig
Length of Stem A: 6.7 cm
Length of Stem B: 6.2 cm

Found near Ludwig's midriff, these two pipe stems have no distinguishing features. Stem A has an outer diameter of 0.9 cm and a 0.3 cm bore diameter; stem B has an outer diameter of 0.8 cm and a 0.2 cm bore diameter. The difference in bore diameter suggests that these two stems are not from the same pipe. Again, they cannot be accurately dated.

W 11698
Ornamented Clay Pipe Stem Fragment. Plate 63
Found: HS, MS, Beams 12-13, 2075-2221 cm from forward
Associated with: Ludwig
Length: 5.8 cm

Excavators also found this pipe stem near Ludwig's midriff. It has an outer diameter of 1.0 cm and a 0.3 cm bore diameter. Similar to Cesar's pipe stem, this stem has a roulette pattern along one end. The pattern on this stem consists of two rows of recurring figure eights with dots inside each loop. Between these two rows, there are four rows of dots. This decoration may indicated a post-1640 date, but without a bowl, dating is difficult.

BOOKS

Unlike smoking, reading was not a novelty in Europe during the seventeenth century. Amongst the Egyptians, Greeks, and Romans, scribes hand wrote thousands of manuscripts and books. In addition to the text, manuscripts of the wealthy included embellishments in colored ink and gold leaf (Gies and Gies 1994:78-79). Early books and manuscripts were expensive. The Romans considered manuscripts to be as valuable as houses and lands (Society for Promoting Committee 1862:34). Upon the establishment of universities during the thirteenth century, the demand for additional copies of ancient and historic texts increased (Febvre and Martin 1976:29).

The first key component of printing, paper, came to Europe from China via the Spanish Moors in the twelfth century. Subsequently, Italy became the primary source of paper. By the fourteenth century, paper replaced parchment. The Italians had a hard time meeting the needs of Europe at the end of the fifteenth century, so papermaking spread to France, Germany, England, Holland, and Switzerland (Febvre and Martin 1976:30-32,37; Gies and Gies 1994:182). Oddly, the popularity of linen undergarments during the late Medieval Period allowed for an increase in paper production. Papermakers used scraps from the production of linen garments to produce paper. As paper production rose, prices decreased, and the market expanded. The scribe became the largest cost factor in creating books, so people began to develop mass production (Gies and Gies 1994:182-183).

Woodblock printing, in which the letters or images were carved and then stamped onto a surface, appeared in the late fourteenth century. Early books with images and text were printed using woodblock printing. After wood block printing, printers turned to engraving—incising copper with a chisel. They could produce more copies by engraving (Gies and Gies 1994:241-242). Printers soon discovered that wooden type could not survive multiple pressings. It was neither durable nor uniform. Thus, John Gutenberg, a silversmith by trade, developed the idea of using cut metal letters in block printing. By 1426, he was using cast metal letters; then, in the 1470s, Gutenberg's assistant, Peter Schoeffer, suggested the application of steel (Gies and Gies

1994:242-243). Moveable type was only one component of printing because printing also required a fatty based ink and the printing press (Febvre and Martin 1976:50).

Gutenberg discovered that water-based writing ink, which scribes regularly employed, easily smudged, so he considered new inks. Using a combination of lampblack, turpentine, and linseed or walnut oil, he created a new ink that adhered to paper without blurring. Using wine and oil presses as a model, Gutenberg also developed a wooden screw press. With the press, multiple colors could be produced in a single impression, and multiple, sharp impressions could be created rapidly (Gies and Gies 1994:243-244).

By 1480, every major city in Europe had a printing press, and by 1500, Venice alone had printed 2,789 books. Printers produced 15 to 20 million copies of 40,000 editions before 1500. As the early modern period began, a wide array of knowledge became available to far more people. In addition to the average noblemen, many commoners became literate, and books, especially religious books, became widely available (Gies and Gies 1994:245-246). Other genres included adventure stories, books of chivalry, tales of voyages and exotic countries and customs, and professional books (Pérez-Mallaína 1998:158-159). Printed books are clearly visible in David Teniers the Younger's 1610 painting "The Alchemist" (Figure 56).

ASSOCIATED BOOKS ABOARD VASA

W 04278
Leather Book Cover. Plate 64
Found: ÖB, SB, Beams 5-6, 1100 cm from forward
Associated with: Adam
Length: 11.7 cm
Width: 7.0 cm

Figure 56. David Teniers the Younger, "The Alchemist," 1610, Mauritshuis, The Hague, The Netherlands, Inv. No. 261.

This find represents the front and back covers of a leather bound book. The book was found adjacent to Adam. Along the front cover's edge, there are four punctured holes. These holes are evidence of the two original brass book clasps. Though the leather covering is very thin and has been exposed to moisture, a pressed decoration is visible. The decoration consists of an approximately 2.5 cm wide border with lines and leaf ornamentation. This border forms a frame around a figure holding a torch or scroll beneath a vaulted arch. The book's title is unclear. It could have easily fit into a sailor's pocket.

W 31150
Leather Book Cover. No Plate Available
Found: ÖB, BB, Beams 8-9, 1490-1630 cm from forward
Associated with: Cesar

Length: 4.5 cm
Width: 3.5 cm

This leather book cover was found in the same general location as Cesar's bones. There are visible traces of threading on the back cover's top and bottom. The book cover is damaged along its outer perimeter. Similar to Adam's book, the title is unclear, and it could have easily fit into a sailor's pocket.

TOOLS

During the sixteenth and seventeenth centuries, ships had carpenters. Each carpenter had a set of tools specifically designed to maintain a wooden ship. According to Colin McKewan of the *Mary Rose* project, a carpenter's tools might include:

> a hand axe; a side axe; an adze; one or two mallets of differing sizes; a range of chisels and gouges; one or two augers; as well as hand or chest braces with a range of bit sizes; a metal-headed hammer or two; a range of planes; a chalk line with a block of chalk; a hand saw; a hook knife; a file or two, and a wooden rule (McKewan 2005:294).

Carpenters and shipwrights used t-shaped hand drills called augers to drill holes for spikes and bolts, and braces to drill smaller holes and starter holes. They had axes for cutting and shaping wood and iron headed hammers for inserting nails. To make the wood thinner or finely shape the wood, carpenters possessed chisels, gouges, adzes, and files. They cut wooden ship timbers with a handsaw and smoothed the edges of cut or shaven timbers with a plane. The mallet, which consisted of a wooden head fitted over a wooden handle, was used to strike chisels or other wooden tools and to drive in wooden pins, wedges, and treenails (McKewan 2005:299-317).

Another type of tool, regularly employed at sea and on shore, was the awl. The tool could be used in sail making and all types of leatherwork (Fred Hocker 2014, pers. comm.). Yet, people of the early modern period, typically, associated the awl with cobblers. Cobblers used an awl when joining the soles to the upper parts. Before stitching the sole to the upper parts, the cobbler made holes along the edges of each piece of leather using an awl. They then passed the threads through the holes and pulled tight (Grew and de Neergaard 2001:48-49). Other tools for making shoes included some form of knife that cobblers used to cut the leather and a wooden mallet, which they used to hammer in the wooden pegs. Aboard *Vasa*, the crew would have used these same tools to make and repair their shoes.

ASSOCIATED TOOLS ABOARD **VASA**

During excavations, archaeologists uncovered 29 mallets, mallet handles, and mallet heads. Two handles and one head were found with skeletal remains. In addition to mallets, researchers found two awl handles and three unidentified tool handles near human remains. The lack of metal components makes the identification of tools particularly difficult.

W 08950
Wooden Awl Handle. Plate 65
Found: ÖB, SB, Beams 5-6, 1070-1220 cm from forward
Associated with: Adam
Length: 7.4 cm

This wooden, bulb shaped tool handle is probably an awl. It was found in the same general location as Adam's bones. It has a circular cross section that tapers from 2.9 cm wide to 1.6 cm wide. While the wider end is rounded, the narrower end is straight cut. A hole with a 0.5 cm diameter is visible on the narrow end. This is where the thin, now deteriorated, awl blade was inserted. Two or three barely visible incised lines decorate the handle's exterior. The tool is small enough to be regularly carried on a sailor's person.

W 08949
Unidentified Wooden Tool Handle. Plate 66

Found: ÖB, SB, Beams 5-6, 1070-1220 cm from forward
Associated with: Adam
Length: 12.1 cm

Discovered near W 08950, an awl handle, this wooden tool handle is associated to Adam's remains. The tool handle has an oval cross-section that tapers from 3.1 cm wide to 1.5 cm wide. While the narrow end is beveled for the placement of a metal tool, the wider end is rounded with a small hole for hanging the tool on a belt or wall. A 0.3 cm diameter hole for tool insertion is located on the narrow end. There are three pairs of decorative lines carved along the handle's exterior. The utilization of this tool handle is unclear.

W 09325
Wooden Awl Handle. Plate 67
Found: ÖB, BB, Beams 8-9, 1490-1630 cm from forward
Associated with: Cesar
Length: 10.5 cm

This oblong shaped tool handle was found near Cesar; it has a circular cross section. The diameter of 67 percent (7.0 cm) of the tool is 2.6 cm. It then tapers to a 1.4 cm diameter. The narrow end has a 0.3 cm diameter hole, where the awl blade was inserted. Neither decorations nor markings are visible on the handle's exterior.

W 07628
Wooden Mallet Handle. No Plate Available
Found: ÖB, SB, Beams 14-15, 2490-2720 cm from forward
Associated with: David
Length: 19.0 cm

This wooden mallet handle was probably not carried on a sailor's person because of its size and utilization. It might have been in David's possession at the time of sinking because it was found with his bones. The handle has an oval cross section with a 0.3 cm large diameter and a 0.2 cm small diameter.

W 07629
Large Unidentified Wooden Tool Handle. No Plate Available

Found: ÖB, SB, Beams 14-15, 2490-2720 cm from forward
Associated with: David
Length: 22.0 cm

Found in the same general location as David, this wooden tool handle has a circular cross section with a 3.0 cm diameter. The type of tool this handle represents is unknown. Given its size, it may also be a misidentified treenail. Since the tool has been misplaced since recovery and no images of the artifact exist, there is no way to no for sure at this stage. If it is a tool handle, it would have been a relatively large tool.

W 04233 and W04240
Wooden Mallet Head and Handle. Plate 68 and Plate 69
Found: UB, MS, Beams 13-14, 2197-2453 cm from forward
Associated with: Ludwig
Head Length: 22.7 cm
Handle Length: 17.7 cm

W 04233, a mallet head, was found with W 04240, the handle of a mallet. Both artifacts were found near Ludwig's midriff and are made of hardwood. The mallet head has an oval cross section that is 8.6 cm long and 7.8 cm wide. A fraction of the handle is protruding from the mallet head's base. This handle fragment has a circular cross section with a 3.1 cm diameter. The mallet head weighs 466 grams, suggesting the tool would have probably not been carried on a sailor's person regularly. The handle has a 1.1 cm diameter hole through one end that would have been used to hang the mallet. The top of the handle, near the break, has a circular cross section with a 3.1 cm diameter. Moving down the handle, the cross section expands into an oval that is 4.1 cm long and 3.3 cm wide. Apart from several small longitudinal cracks, the handle is in relatively good condition.

WEAPONRY

While the earliest signs of metallurgy date to the seventh millennium B.C., the earliest examples of swords date to between 3,400 and 3,000 B.C. Archaeologists uncovered these prehistoric swords amongst a hoard of weapons in Arslantepe, Turkey. Prehistoric people created swords using an arsenical copper. The swords consisted of a blade, a grip, and a guard. By the end of the Bronze Age (3600-600 B.C.), metal tools were mainstream in Europe. While metallurgists designed malleable copper swords for thrusting, they designed bronze swords for cutting and thrusting (Draeseke 2009:11).

The next step in sword development was the creation of iron swords. Since iron swords had little advantage over bronze swords, the Bronze Age people of Anatolia, the Hittites, created steel—a combination of iron and carbon—swords. Steel swords exhibited the perfect combination of flexibility and rigidity. To perfect this combination, the Celts developed the pattern-wielding technique in the eighth century B.C. The pattern-wielding technique required "the interweaving of different rods of harder and softer steel repeatedly folded back on itself" (Draeseke 2009:12). During the Roman Period, artisans mass-produced steel swords for the Roman legions. Medieval sword blades had layers of high-carbon steel that created extremely sharp edges. By the sixteenth century, with the help of blast furnaces and moulds, bladesmiths could mass-produce swords and naval guns. Blacksmiths made mass-produced weapons of iron because of its availability and cheapness (Draeseke 2009:12-14). Elite citizens and soldiers wore swords as a part of their daily attire. A seventeenth-century sword and scabbard are illustrated in Thomas de Keyser's 1626 painting of an ensign (Figure 57).

Figure 57. Thomas de Keyser, "Loef Vredericx as Ensign," 1626, Mauritshuis, The Hague, The Netherlands, Inv. No. 806.

The Chinese invented gunpowder, a mixture of saltpeter, sulfur, and carbonaceous material, as early as the ninth century. They did not just use gunpowder in fireworks. By A.D. 950, they had sophisticated military rockets and guns. Over four centuries, the Chinese experimented with weapons. By the mid-1300s, the primitive gun had a metal barrel, a reliable explosive, and a projectile that easily fit into a bore. During this period, firearms reached Europe, but Europeans originally saw little need for the dangerous weapons. Instead, they focused on improving the crossbow (Gies and Gies 1994:95,204). The first European handguns appeared at the end of the fourteenth century. Men ignited early guns by heating a wire and inserting it into a touchhole on the metal barrel (Gies and Gies 1994:209). Europeans found early firearms unreliable and complex.

During the fifteenth century, gunpowder artillery flourished in Europe. Europe quickly surpassed Asia technologically. In the 1420s, Europeans made gunpowder safer to handle and more reliable by dampening the powder with vinegar, brandy, or wine and sieving it to form coarse granules. The projectile decreased in size, and men used more gunpowder. A new handgun with a touchhole on the side, a priming pan, and a slow match (a cord soaked in niter and alcohol) attached with an s-shaped device called a *serpentine* appeared in the early fourteenth century. At the end of the century, gun makers enclosed the fire mechanism and added a spring trigger and wooden stock to absorb the recoil. The developers called the new gun a matchlock musket (Gies and Gies 1994:247).

Matchlock muskets had three problems. The weapon often failed mechanically, took several minutes to reload, and failed to work in wet weather. Despite its failures, by 1500, soldiers regularly employed the musket on battlefields, and the weapon supplanted the crossbow by 1550. As muskets gained popularity, governments trained soldiers dedicated to firing the new weapons called musketeers (Gies and Gies 1994:247-248). The wheel lock and flintlock muskets succeeded the matchlock musket.

A wheel lock had a spanner that turned a wheel mechanism toward a piece of pyrite. The wheel turning produced a spark that ignited the weapon. This type of gun often jammed or broke. Since wheel lock muskets were expensive and difficult to maintain, soldiers rarely used this method of ignition. Instead, upper class citizens owned the weapons (Haythornthwaite 1983:30). Soldiers preferred more durable flintlock muskets.

The more expensive flintlock muskets consisted of a piece of flint held in a cock. When the piece of flint hit a ‘steel,’ a spark ignited the charge. Flintlock muskets lacked the stray sparks created by matchlock muskets. Soldiers found them easier to use, just cock it and fire.

Unlike matchlock muskets, flintlock muskets were nearly waterproof and were invisible at night (Haythornthwaite 1983:32-33).

By the seventeenth century, musketeers held the key to warfare (Haythronthwaite 1983:29). The musketeer, who was considered a soldier, served either on land or on a ship. Seventeenth-century musketeers had two types of muskets: the ordinary musket, which had a 4.5 ft (1.37 m) long barrel, and the lighter 'caliver' musket, which had a 3.5 ft (1.07 m) long barrel. Muskets had either curved-butted stocks or straight-butted stocks. Musketeers preferred lead balls weighing 1/10 or 1/12 of a pound. They used a long wooden ramrod to ram gunpowder, a lead ball, and wadding, which kept the ball from rolling out, into the musket's bore before firing. The time it took a musketeer to load a gun depended on his proficiency and experience (Haythronthwaite 1983:29-30).

Swedish muskets were designed by Dutch patterns. From the 1620s on, they were generally 1.55-1.66 m long, with 1.15-1.19 m long barrels. They weight around five pounds. As in the Netherlands, muskets would be drilled for 10-pound musket balls, which have about a 1.98 cm diameter (Hamilton and Sandström 1982:72). Seventeenth-century muskets, including those of the Swedes, were extremely inaccurate. They could, however, produce extensive damage when fired at close distance. During the Napoleonic Wars, a musket only had a range of 200 to 300 yards (182.88 to 274.32 m) and only hit the target 0.2 to 0.5 percent of the time (Haythronthwaite 1983:33-34).

In addition to the musket, a musketeer's basic equipment included a leather bandolier—a leather shoulder strap. Musketeers had around twelve cartridge tubes, a bag of musket balls, and one to two additional gunpowder holders or flasks attached to the bandolier. The cartridge tubes each contained one shot worth of gunpowder (Haythronthwaite 1983:33-34). This costume allowed the musketeers to be ready for action at a moments notice. Johan Jacobi Wallhausen clearly illustrates the seventeenth-century musketeer in full gear loading and firing a musket in his book *Defensio Patriae Oder Landtrettung (Frankfurt 1621)*, now located at the Armêmuseum in Stockholm, Sweden (Figure 58).

Figure 58. Johan Jacobi Wallhausen, "Loading a Musket," 1621, Armémuseum, Stockholm, *Defensio Patriae--Landtrettung, Frankfurt 1621*.

ASSOCIATED WEAPONRY ABOARD VASA

Before discussing associated weaponry aboard *Vasa*, it is important to remember that *Vasa* was not fully prepared when it sank in August 1628. The approximately three hundred soldiers who would have been assigned to the ship had not yet come aboard. Hence, their equipment, including their weaponry, were also not on board. The *Vasa*, therefore, only contained around six swords, two short hunting knives, four military muskets, and two hunting rifles (Draeseke 2009:40; Hamilton and Sandström 1982:48).

W 09054 and W 09005
Wooden Cartridge Tube and Lid. Plate 70 and Plate 71
Tube Found: ÖB, SB, Beams 6-7, 1220-1330 cm from forward
Lid Found: ÖB, SB, Beams 5-6, 1220-1330 cm from forward
Associated with: Adam
Tube Length: 11.4 cm
Tube Maximum Diameter: 3.5 cm
Lid Length: 2.5 cm
Lid Maximum Diameter: 2.8 cm

Considered a primary component of a musketeer's equipment, researchers found this wooden cartridge in the same general area as Adam. The cylindrical container is broken into three pieces lengthwise, and the bottom is missing. After restoration, the cartridge tube's original form was apparent. The tube's top is approximately 2.0 cm long with a 2.2 cm diameter. During the 1960s excavations, archaeologists discovered a wooden lid, W 09005, near the cartridge tube. The lid was split into two parts vertically. Conservators restored the lid to its original form. Cylindrical in shape and hollow, the lid has a 2.3 cm diameter along its base. The diameter expands to 2.8 cm approximately 0.5 cm from the top. The lid sides are between 0.1 and 0.2 cm thick. The lid's top edge has a 0.2 cm diameter hole; this may be one of the attachment points for the tube or shoulder belt. Beyond the lid, the cartridge tube increases in diameter to 2.5 cm. The cylindrical tube continues to expand across its entire length. A maximum diameter of 3.5 cm is reached at the tube's base. A 1.0 cm wide band extends 0.4 cm from the cartridge tube surface, encircling the top. This band had either a hole or a wooden ring that fastened to a shoulder belt.

W 10117, W 10118, and W 10119
Wooden Sword Grip, Scabbard, and Baldric. Plate 72, Plate 73, and Plate 74
Found: ÖB, SB, Beams 22-24, 3710-4000 cm from forward
Associated with: Filip
Grip Length: 7.9 cm
Grip Maximum Width: 2.6 cm
Grip Thickness: 1.9 cm
Scabbard Length: 85.5 cm
Scabbard Maximum width: 5.2 cm
Scabbard Thickness: 1.9 cm
Baldric Length Part A: 43.5 cm
Baldric Length Part B: 37.5 cm
Baldric Width: 4.2 cm
Baldric Thickness: 0.4 cm

This sword grip, scabbard, and baldric were found near Filip, just in front of the great cabin, near the whipstafff. If the sword is in fact Filip's, he may have been wearing the sword in an effort to look presentable. The sword and Filip were in direct association (evident by the sequential numbering of the artifacts) with W 10116, the butt and stock of a valuable hunting musket. The presence of both high quality materials on one person aboard a ship is unusual. Direct identification of the materials with Filip is difficult because of the condition of this area at time of recovery. Much of the material in this area migrated from the great cabin immediately aft of steerage when the bulkhead at beam 23, located between the two rooms, collapsed. Yet, Carl Olof Cederlund suggests that the interior of the steerage, particularly the starboard side (the location of Filip), was protected from too much disturbance by the eroding bulkhead planks. In this way, Filip and his belonging, including the sword and hunting rifle, were sealed off from the great cabin materials by the bulkhead (Cederland 2006e:320).

A majority of the sword grip is constructed of wood that is symmetrically patterned in s-spirals. A metal wire thread surrounds the wooden grip. Another layer of wire thread is wrapped around the bottom layer, along the grip's spiraling grooves. The threads are made of two strands twisted into double helixes that are then twisted into a larger double helix. One end of the grip is 2.6 cm wide and is constructed of metal. It contains a rectangular hole for the sword tang. The hole is 1.4 cm long and 0.6 cm tall. The other end is 2.3 cm wide and has a hole that is 0.8 cm long and 0.4 cm tall. The grip weighs 30.3 grams. The grip's magnificence suggests an impressive sword that may have belonged to a lower ranking officer. It would have been cheaper to make, but still looked nice (Draeseke 2009:43).

Made entirely of wood, the scabbard was found in two halves. The two halves were originally bound together with a leather covering; it is still visible in some areas. The scabbard is long, narrow and tapers to a point at one end. The chape—a metal mount at the end of a scabbard—did not survive. As a form of embellishment, each side of the scabbard's top end is decorated with a v-shaped recess and an engraved herringbone pattern. There are five raised, horizontal bands unevenly spaced along the scabbard front. One band is 1.0 cm wide and is located 9.6 cm from the scabbard throat. This band is the stopping point for the sword's baldric, W 10119. The scabbard's interior has iron stains, suggesting the sword blade decayed inside. Using the wooden scabbard's inner dimensions, Trevor Draeseke estimated the original blade's size and shape. The military sword had a 5.0 cm wide blade at the hilt, and was classified as a *reitchivert* sword (Draeseke 2009:49).

Artifact number W 10119 consisted of two leather straps. They seem to be pieces of a baldric. The leather baldric was attached to a leather frog that is now missing. The leather frog held the scabbard. While the longer leather strap has six sets of two holes in diagonal patterns, the shorter one has two sets of two holes in the opposite diagonal pattern. The holes may have allowed the straps' ends to meet at 45-degree angles near the hip or they may be for decorative purposes, originally containing a series of metal or wooden studs (Draeseke 2009:52).

W 10116
Hunting Rifle Butt and Stock. Plate 75 and Plate 76
Found: ÖB, SB, Beams 22-24, 3710-4000 cm from forward
Associated with: Filip
Max Length: 53.7 cm

Found near Filip, this find consists of small hunting rifle butt fragments and a large portion of a hunting rifle stock. It is probably a Dutch hunting weapon (lodbössa), with a flint slamlock. These types of weapons are associated more with the officers than the regular seamen; they have status connotations. The stock is 53.7 cm long. The distance from the barrel's end to the butt is 24.5 cm. The butt has a 9.5 cm height and a maximum width of 2.5 cm. The flintlock recess is 17.3 cm long. The butt's centerline forms a 17-degree angle with the stock, creating a slight curve (Hamilton and Sandström 1982:66-67). The stock's tip is broken. The weapon is constructed of alder wood. Although researchers discovered the Dutch flintlock hunting rifle near Filip, it is unlikely that it belonged to him, especially given its aforementioned, direct association with an officer quality sword. Filip would have probably not needed to carry the hunting weapon while aboard the ship.

W 10270
Flint. No Plate Available
Found: ÖB, SB, Beams 22-24, 3710-3930 cm from forward
Associated with: Filip
Measurements unknown

A piece of flint was found near Filip, near the great cabin. Little information is known about this artifact because it is now missing.

W 10689, W 30503, W 17031
A Wooden Musket. Plate 77, Plate 78, and Plate 79

W 10689 Found: TD, BB, Beam 2, 519 cm from forward
W 30503 Found: TD, BB, Beam 1, 370 cm from forward
W 17031 Found: HS, BB, Beams 3-4, 667-832 cm from forward
Associated with: Ivar
Overall length: 151.0 cm

This musket consists of three parts: the stock, W 10689, the butt, W 30503, and the fore stock, W 17031. While archaeologist found the musket stock and butt on the orlop in the same area as Ivar's midsection, including his upper right shoulder (clavicle and scapula), they found the forestock in the hold, near Ivar's right forearm (radius and ulna). Researchers believe the forestock, along with the Ivar's right radius and ulna, fell through the gaps created in the orlop planking by shifting ballast. This association suggests that the end of the musket was very close to Ivar, perhaps in his hands, at the time of sinking. Thus, he may have been on duty at the time of sinking.

The musket is a standard musket with a Spanish-Dutch butt. The stock contains a 20.0 cm long recess for the snaplock and an open chute for the ramrod. The fore stock has a semi-circular grove for the insertion of a metal barrel. The groove is 3.7 cm wide near the butt and 2.9 cm wide at the musket's nose. The butt's centerline forms an 18-degree angle with the stock, creating a slight curve (Hamilton and Sandström 1982:82). The musket is made from alder wood. These three finds were found with W 30505, a ramrod.

W 30505
Wooden Ramrod. Plate 80 and Plate 81
Found: TD, BB, Beams 0-1, 0-370 cm from forward
Associated with: Ivar
Length: 112.5 cm
Diameter: 1.1 cm

This find is a wooden ramrod for a musket (W 10689, W 30503, and W 17031). Archaeologists discovered both the ramrod and musket in the same confined area as Ivar. The rod is long and narrow, with a round cross-section. The ramrod has an 8.5 cm long, flat top with four transverse slots, or notches, and a 2.5 cm long, conical bottom with an abruptly terminated tip. The ramrod is broken into two sections approximately 29.0 cm from the conical end.

W 19536, W19537, and W19538
Gunpowder Horn, Lid, and Stopper. Plate 82 and Plate 83
Found: TD, BB, Beams 1-2, 370-519 cm from forward
Associated with: Ivar
Horn Length: 44.5 cm
Horn Maximum Diameter: 8.0 cm
Lid Diameter: 8.5 cm
Lid Thickness: 1.4 cm
Stopper Length: 5.5 cm
Stopper Maximum Diameter: 3.5 cm

W 19536 is identified as a gunpowder horn used by a gunner or musketeer. It is made of cow horn. Researchers found the curved, hollow horn, along with its wooden lid and stopper (W 19537 and W19538), in the same confined space as Ivar. There is a 4.0 to 5.0 cm wide carved band in the middle of the horn and a 1.0 cm wide band on the horn's narrow end. It is significantly fractured along the wide end (8.0 cm diameter), while the narrow, spout end (2.2 cm diameter) has only been damaged slightly. The wooden gunpowder horn lid is round and has a 2.0 cm wide, square knob in its center. The knob is 1.4 cm tall and has an oval head. The lid's round base is thicker along the outer edge, creating a step up. The gunpowder horn stopper, or plug, is made of wood and lead and has a circular cross-section. The bottom has a 2.0 cm diameter. Midway up, the stopper abruptly increases in diameter to 3.5 cm; this prevents the stopper from sliding completely into the gunpowder horn.

W 17091
Three Lead Musket Balls. Plate 84
Found: HS, BB, Beams 3-4, 667-832 cm from forward
Associated with: Ivar
Diameter: 1.8 cm

Researchers found these three cast lead musket balls in close proximity to W 17031, the fore stock of Ivar's musket. The casting seam is still visible on one of the spherical projectiles. Ivar's musket likely fell through the above hatch during sinking or excavation, so the musket balls may have done the same. If the musket balls were Ivar's, he would have carried the musket balls in a pouch attached to a shoulder belt. The musket balls could have also been scatter from a small broken keg found just on the other side of beam 4 in the hold. The small broken keg, along with five other small intact kegs, contained 9,000 musket shots of this size (Cederlund 2006: 367-368).

CONCLUSIONS

This chapter analyzes the personal belonging and utilitarian items found in association with *Vasa*'s human remains, in reference to seventeenth-century trends. These various items and their basic descriptions are recapitulated in Table 3 according to individual association and will be interpreted in more detail in Chapter 6. It is clear from the analysis that clothing is not alone in its function of communication. In addition to sailor dress, the personal possessions that sailors regularly carried in their pockets, pouches, and bags and on their belts differentiated the sailors by class and integrated them within the larger Swedish society. These personal possessions include spoons, knives (usually in a sheath), combs, coins, keys, books, and pipes. For the most part, all Swedish civilians, rich or poor, carried these same materials; the aristocrats, including perhaps higher ranking officers, typically carried the spoons, knives, keys, books, and pipes made of higher quality materials, with elaborate decorations. Along with personal possessions, several of the *Vasa* remains had associated utilitarian items—items associated with the seaman's trade or shipboard life. Sailors may have been using these items, which included mallets, awls, lanterns, muskets, and swords, just before or during the wreck, only to die with them in hand or nearby.

Table 3: Personal Belongings and Utilitarian Items Found in Association with Human Remains Aboard *Vasa*

Artifact Type	***Find No.***	***Association***	***Exact Location***	***Noteworthy Features***
Wooden spoon	03171	Adam	ÖB, SB, Beams 5-6	Egg-shaped bowl; profiled handle that comes to a point; visible traces of paint on handle
Wooden spoon	04282	Adam	ÖB, SB, Beams 5-6	Broken into two part; one part is bowl and base of wooden handle; second part is upper half of handle; end of spoon handle is carved into a knob
Wooden knife handle	03222 (27113)	Adam	ÖB, SB, Beams 5	Elongated wooden handle with an oval cross-section; handle tapered and slightly curved
Wooden knife sheath	03221	Adam	ÖB, SB, Beams 5	Five fragments containing hollowed out backs; several visible markings
3 clay pipe fragments	08945	Adam	ÖB, SB, Beams 5-6	Two stem pieces and the base of a bowl; dark brown
Leather book cover	04278	Adam	ÖB, SB, Beams 5-6	Front and back covers of a leather bound book; evidence for book clasps; pressed decoration visible—border with lines and leaf ornamentation; could fit in pocket
Wooden awl handle	08950	Adam	ÖB, SB, Beams 5-6	Bulb shaped; incised lines decorate handle's exterior
Unidentified wooden tool handle	08949	Adam	ÖB, SB, Beams 5-6	Associated with above awl; oval cross-section

				that tapers; three pairs of decorative lines carved along handle's exterior; utilization uknown
Wooden cartridge tube and lid	09054, 09005	Adam	ÖB, SB, Beams 5-6	Cylindrical and hollow container broken into three pieces lengthwise; the lid was split in two; lid's top edge has a hole
Wooden spoon	03259	Beata	ÖB, BB, Beams 5-6	Broken; made of either softwood or larch; handle has oval cross-section
Wooden knife handle	04276	Beata	ÖB, MS, Beams 5-6	Oblong shaped wooden handle with oval cross-section
Bone comb fragment	09018	Beata	ÖB, BB, Beams 6-8	Has visible teeth; it is two-sided with finer teeth for removing parasites and wider spaced teeth for hairstyling
7 clay pipe stems	09019	Beata	ÖB, BB, Beams 6-8	From two or more pipes
6 wooden spoon fragments	03244	Cesar	ÖB, SB, Beam 4	Made of either beech or alder wood; fragments include the handle with base of the spoon bowl and five pieces of the bowl; handle has decorative carved outline
Clay pipe stem and bowl	03245	Cesar	ÖB, SB, Beam 4	Consists of a nearly complete bowl with no burn marks and a single stem; the bowl rim has a milled ring decoration
Clay pipe stem and bowl	09324	Cesar	ÖB, BB, Beams 8-9	Intact bowl and sing stem; the bowl rim has

				a milled ring decoration
Leather book cover	31150	Cesar	ÖB, BB, Beams 8-9	Leather book cover; visible traces of threading on back cover’s top and bottom; could fit into pocket
Wooden awl handle	09325	Cesar	ÖB, BB, Beams 8-9	Oblong shaped with a circular cross-section; no decorations
Two fragments of a wooden spoon bowl	07642	David	ÖB, SB, Beams 14-15	Fragments of oval-shaped spoon bowl made of beech wood
Wooden spoon	07648	David	ÖB, SB, Beams 14-15	Spoon broken in two parts, probably round; spoon’s underside has traces of red-brown paint
Wooden knife handle	07645	David	ÖB, SB, Beams 14-15	Cylinder shaped with oval cross-section; traces of mending
Fork handle	07636	David	ÖB, SB, Beams 14-15	Made of high class, expensive pear wood; adorned with a circular knob of bone, capped with a round piece of brass
Fractured clay pipe bowl	07617	David	ÖB, SB, Beams 14-15	Black inside and along rim; not unique features
4 clay pipe stems and 2 broken bowls	07632	David	ÖB, SB, Beams 14-15	Two bowls are badly broken; one stem has milled ring decorations on both ends
Lid to a bentwood box	07649	David	ÖB, SB, Beams 14-15	Small enough to fit in pocket
Wooden mallet handle	07628	David	ÖB, SB, Beams 14-15	Handle has oval cross-section
Large unidentified wooden tool handle	07629	David	ÖB, SB, Beams 14-15	Circular cross-section: utility unknown
Wooden spoon bowl	18429	Erik	TD, BB, Beams 16-18	Broken along upper edge; probably oval-

				shaped; small length of handle preserved
3 clay pipe stems and a bowl	11533	Erik	UB, SB, Beams 18-19	Fragmentary stems; the bowl has incuse mark, which resembles a decorated vase (perhaps a maker's mark)
Fragment of a wooden spoon bowl	10268	Filip	ÖB, SB, Beams 22-24	Spoon bowl's right half; made of beech wood
Wooden knife handle	10124	Filip	ÖB, SB, Beams 22-24	Elongated, rectangular-shaped knife handle; oval cross-section; has a broken end, which has visible red color; other end has blue-grey coloring
Wooden knife handle	10253	Filip	ÖB, SB, Beams 22-24	Composed of two halves, each with a curved outer surface and flat inner surface; three holes where nails connected halves; one half has reddish-brown stain
Wooden knife sheath	10252	Filip	ÖB, SB, Beams 22-24	Associated with above handle; broken into six pieces, each one is thin and long with a hollow back; there are carved groves where the sheath was originally threaded together
Clay pipe stem	10291	Filip	ÖB, SB, Beams 22-24	Nondescript fragment
Wooden sword grip, scabbard, and leather baldric	10117, 10118, 10119	Filip	ÖB, SB, Beams 22-24	Majority of grip is wood with symmetrically patterned s-spirals; two layers of wire thread surround grip; scabbard found in two

				halves, originally bound together with leather covering; scabbard long, narrow, and tapers to a point; scabbard has carved embellishments; baldric consists of two leather straps, which would have been attached a leather frog
Hunting rifle butt and stock	10116	Filip	ÖB, SB, Beams 22-24	Small butt fragment and large portion of stock; slamlock; made of alder wood
Flint	10270	Filip	ÖB, SB, Beams 22-24	Misplaced
Decorative bone pommel	01473	Helge	UB, BB, Beams 13-14	Found inside Helge's pants pocket; bulb shaped decorative end of wooden knife handle
Leather knife sheath	14310	Helge	UB, BB, Beams 13-14	Found inside Helge's pants pocket; consists of two rolled layers of full-grain leather; the outer layer is sewn together with visible stitching
Wooden top of lantern	10690	Ivar	TD, SB, Beam 2	Hood of horn lantern; top hat like shape; burn marks from candle
Clay pipe fragment	19531	Ivar	TD, BB, Beams 1-2	Misplaced since 1961
A wooden musket	10689, 30503, 17031	Ivar		Consists of three parts: a stock, butt, and fore stock; slamlock; made of alder wood
Wooden ramrod	30505	Ivar		Long and narrow, with a rounded cross-section; flat top with four transverse slots

				and a conical bottom with an abruptly terminated tip; broken into two sections
Gunpowder horn, lid, and stopper	19536, 19537, 19538	Ivar		Cow horn; wooden lid with a square knob in the center; stopper is made of wood and lead and has a circular cross-section; the stopper abruptly increases in diameter from bottom to top
3 lead musket balls	17091	Ivar		Casting seam visible; spherical projectiles
Wooden Lantern Base, Top, and Slat	17671, 17672, 17668	Johan	HS, SB, Beams 6-7	About two-thirds of a horn lantern
Wooden knife handle	04238, 14294	Ludwig	UB, MS, Beams 13-14	Two portions of a wooden knife handle; circular cross-section
Clay pipe stem fragment	04244	Ludwig	UB, MS, Beams 13-14	Nondescript fragment
2 clay pipe stem fragments	11693	Ludwig	HS, MS, Beams 12-13	Probably not from same pipe; no distinguishing features
Ornamented clay pipe stem fragment	11698	Ludwig	HS, MS, Beams 12-13	Pattern on stem consists of two rows of recurring figure eights with dots inside each loop; between these two dots, there are four rows of dots
Wooden mallet head and handle	04233, 04240	Ludwig	UB, MS, Beams 13-14	Mallet head has oval cross-section; handle cross-section expands from circular to oval going down
Iron key	23071	Ylva	Outside of the ship	Only key found; round key shaft forged to a bit with at least two steps; bow is circular loop; wide collar

				between bow and shaft

CHAPTER 6: A *VASA* SAILOR EXEMPLIFIED: ARCHAEOLOGICAL INTERPRETATIONS

“It is an interesting question how far men would
retain their relative rank if they were divested
of their clothes” (Thoreau 1895:38).

This material culture study had two primary goals: to identify the distinctive features of a typical sailor serving on the *Vasa* and to determine the historical significance of the identified features. This was accomplished with an examination that included the identification, cultural analysis, and evaluation of 66 clothing or shoe fragments, 37 personal possessions, 152 coins, two lanterns, seven tools, one hunting rifle, and 12 pieces of military equipment—277 artifacts in all. In the 1960s, archaeologists uncovered these 277 artifacts in close proximity to the remains of nine men, probably crewmembers, and two females believed to be passengers. This examination allowed the researcher to make general interpretations about the Swedish sailors’ clothing and personal belongings and understand how sailors used their appearance to generate or reinforce cultural identities. The sailors’ positions within larger Swedish society and the parallels between Swedish and non-Swedish sailors are explored in this chapter.

A GENERALIZED SAILOR

The Swedish Navy did not start issuing uniforms until the 1740s (Lybeck 1945:446). Everyone dressed to taste and availability. Traditionally, Swedish sailors received a portion of their salary in cloth, which consisted of many different fabric types, including domestic homespun fabric and and imported uncut broadcloth. The quality varied, but the quantity, approximately six to ten yards a year, was consistent. Then, in 1621, there was a salary settlement that eliminated the distribution of fabric as a form of salary. Instead, seamen and officers received an extra monetary salary. This settlement was extremely unpopular and few observed the provision. Within a few years, the Swedish Navy abolished the new terms. As an alternative, well into the 1630's, they agreed to supply on duty sailors and officers with imported broadcloth as part of their pay (Looström and Stapf 1983:39-43; Lybeck 1942:372-373). Sometimes during the winter, the Navy Allotment System also provided a fine quality shirt, long wool or linen socks, and a couple of leather shoes. When off duty, men bought their own clothes, using portions of their salary (Lybeck 1942:372-373).

Until roughly 1650, Swedish seamen manufactured their own outer garments using the allocated cloth (Lybeck 1942:373). The intended production of clothing is evident on *Vasa*. Aboard *Vasa*, archaeologists discovered a large—200.0 cm x 40.0 cm—uncut piece of cloth that was worth a year's salary (W 21288). They also uncovered a sewing kit (W 08202) inside a seamen's chest (W 08010). The sewing kit included a skein of silk, a thimble, a small pearl knife handle, linen thread, and lumps of wax that sailors rubbed on the thread to make it more resistant to moisture (Looström and Stapf 1983:43). Despite the allocation of cloth, seventeenth-century sailors were ill prepared for the cold winter months because they failed to properly line their clothing (Lybeck 1949:373).

Typically, men provided their own linen or silk undergarments and shoes. Although they constructed their own undergarments, they rarely owned more than one set of underwear before the 1640s (Lybeck 1942:372-373). The presence of awls, unshaped leather fragments, and lasts aboard *Vasa* is an indication that seamen also created or at least repaired their own shoes. The presence of shoes inside seamen's chests and barrels suggests that either several sailors owned more than one pair of shoes or some sailors were not wearing shoes when the ship sank. In comparison to the number of human remains, large quantities of shoes were found aboard. This may be further indication of the men owning more than one pair of shoes.

By closely examining the clothing fragments found in association with nine deceased sailors, the average working suit manufactured by a seventeenth-century Swedish sailor can be established. Once the generalized suit is identified, the researcher can begin 'decoding' the sailors' appearances—interpreting the visible symbols (i.e. symbols of power, status, wealth, etc.) encoded in sailor dress, bodily adornments, and accouterments (Beaudry *et al*. 1191:155). The average *Vasa* sailor's wardrobe, similar to the English sailor's typical wardrobe in 1628, included linen shirts, drawers, a jacket, knee breeches, stockings, and a pair of tie shoes. They wore either a close-fitting woolen cap or a large felt hat, along with a pair of mittens or gloves.

Of the nine deceased sailors, six to seven wore a close-fitted, hip-length woolen jacket. One wore a close-fitted, long waisted woolen jacket. While five jackets were plain woven, three were twill woven. Only three sailors had a dyed jacket. The hip-length jackets had 8-9 cm long decorative skirts extending from their bottom edge; the trapezoidal skirt tabs overlapped along the center front and center back. The jackets had round, standing collars and either straight cut or tapering sleeves. The men fastened each jacket, with either a row of metal or wooden buttons or brass or iron hooks and eyes, from the collar's base to just above the skirt. The collection of 12 glass buttons found with Filip suggests 12 fasteners ran along the jacket's right front panel edge, but this likely varied by jacket. Archaeologists uncovered one complete woolen jacket, W 07883 (Figure 59). Although it was not discovered in association with human remains, the jacket clearly illustrates early seventeenth-century jacket construction.

The seamen used their allotted fabric in making 'cloak bag breeches.' The knee breeches had full oval legs that tapered at the bottom. They were either gathered or pleated along the waistline and had large pockets on either side. The most common clothing decoration was a woven band, typically blue-dyed, that likely ran along each leg's outer seam. From the knee down, the seamen wore loosely woven, coarse wool stockings. Unlike the *Kronan* collection, the *Vasa* finds did not include decorative garters, which would have kept the stockings from falling. Perhaps the men secured their stockings with decorative ribbons, similar to the one found with Filip.

Figure 59. Complete blue-dyed wool jacket, W 07883, Courtesy of Vasamuseet.

On their feet, most men wore shoes with two latchets that they tied together—tie shoes. These straight-soled shoes typically had an opening along each side that permitted the sailor to comfortably tie his shoe. Their shoes had five to six heel flaps, creating a relatively high heel. Sailors greased their leather shoes to prevent seepage. Seamen also wore thick mittens or gloves.

Some gloves and mittens consisted of two parts, a knitted wool interior and a leather exterior. This combination was perfect for the sea.

This generalized outfit is similar to the working suits worn by the Swedish sailors portrayed in an anonymous Dutch copper engraving of Queen Kristina falling into the water at Skeppsholmen on 14 May 1652 (Figure 60). The seamen are sitting and standing on a wall along the engraving's left side. Seamen wearing close-fitting woolen jackets with skirts, knee breeches, and stockings are also pictured in C. I. Visschers's 1644 copper engraving of the Battle of Femern (Figure 61). The seamen are climbing into a rowboat following the destruction of their ship.

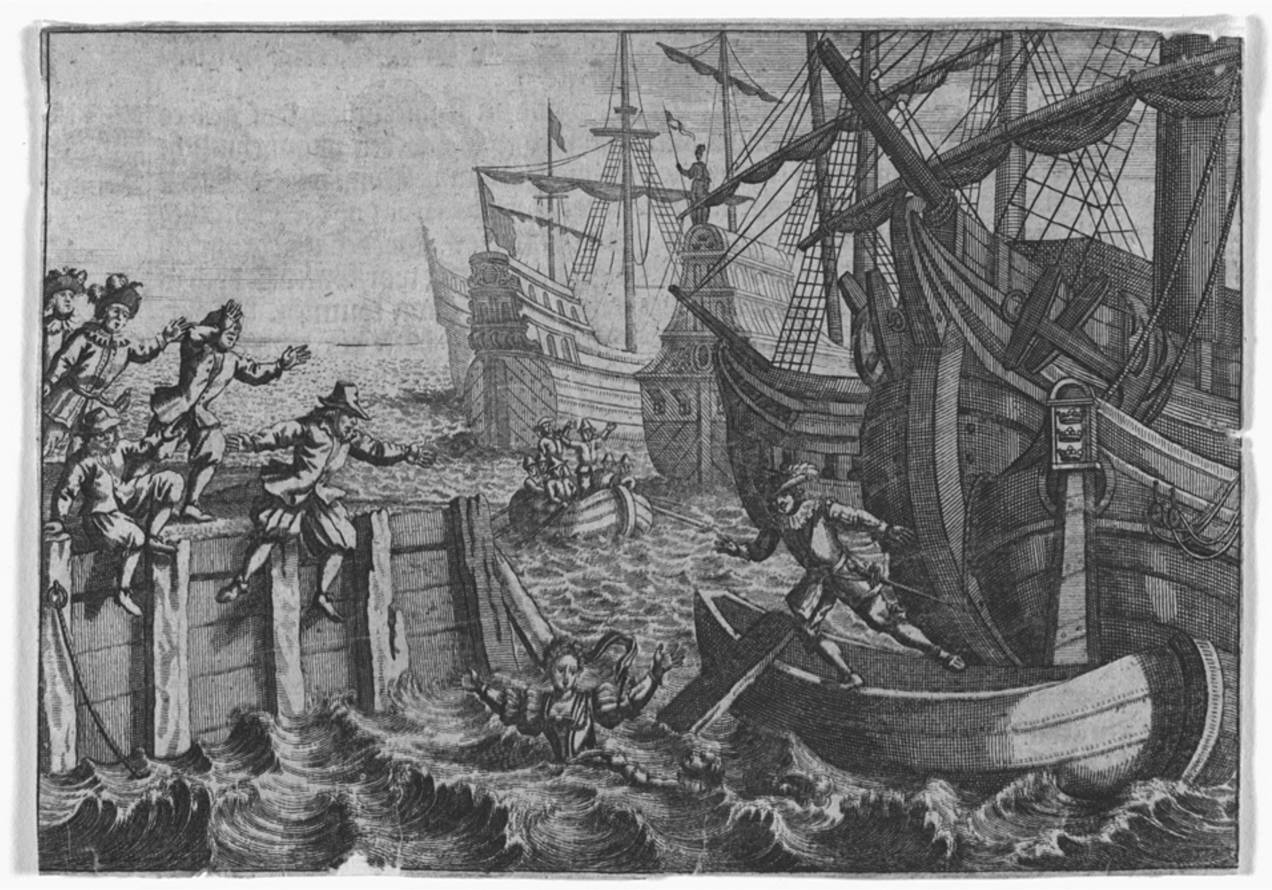


Figure 60. Unknown Artist, Copper Engraving, Queen Kristina falling into the water at Skeppsholmen on 14 May 1652, Kungliga Biblioteket.

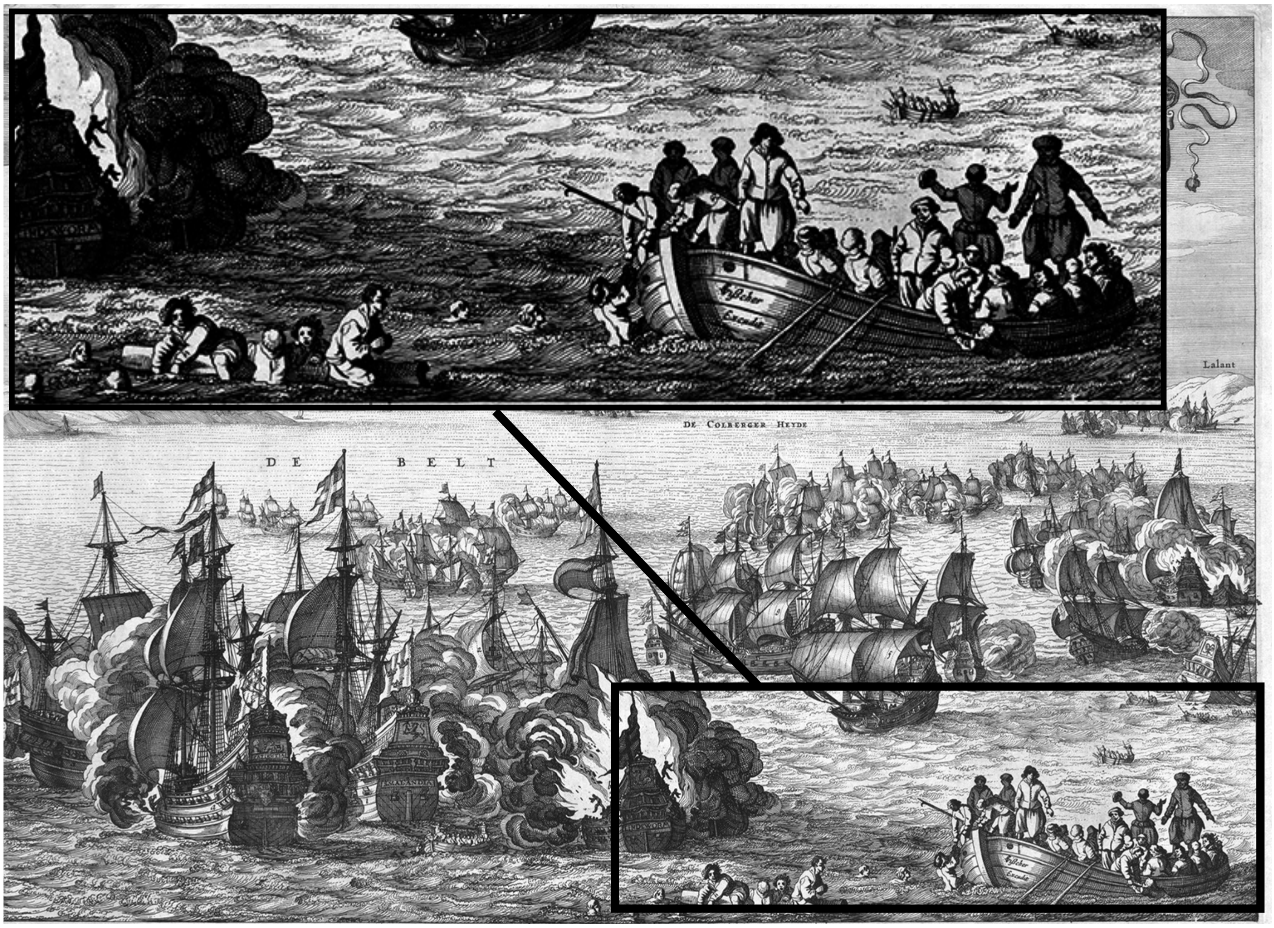


Figure 61. C. I. Visscher, Copper Engraving, The Battle of Femern, 1644, Kungliga Biblioteket.

In addition to the clothes on their back, the men had a few items that they carried with them regularly. Similar to the average peasant and noblemen, *Vasa* seamen carried a knife within a knife sheath either in their pocket or strapped to a leather belt or baldric. Their knives had wooden, cylinder or club shaped handles. They used wooden and leather sheaths. A seaman's knife served multiple purposes, including eating utensil, hand held weapon, and a working tool (a tool of the trade).

For long expeditions, the Swedish Navy supplied average seamen with food, consisting of dry bread, salt fish, pork, salt meat, flour, cheese, butter, grits, peas, and beer. Alternatively, officers had a "cabin diet" (Lybeck 1942:374). The "cabin diet" consisted of expensive breads, meats, cheeses, and vegetables. The navy provided each officer with a cash compensation based on their rank (Lybeck 1942:374). When consuming their food, *Vasa* sailors used round, flat plates, bowls, tankards, spoons, and/or knives. A few plates, tankards, spoons, and knives have engraved markings, suggesting they were personal possessions. The Swedish Navy did not issue these items.

Although they did not have fancy carrying cases, the seamen carried their spoons with them. As is common in the northern tradition, the *Vasa* seamen carved their spoons from wood. As a form of personal embellishment, some seamen painted their spoons or carved elaborate decorations on the spoon handles and bowls. This may represent a way of customizing, or individualizing, their possessions, an alternative to previously discussed house-marks and holdings-marks. It may have also been a way for sailors to ameliorate, or enrich, the dark, grimy environment of the ship or, particularly in the case of carving, a way to pass time. The spoons generally had a flat profile and an ovoid spoon blade. Three spoons found with human remains have short (6.5-9.0 cm long) handles. Later historical accounts suggest that seamen clipped off the end of their metal spoon handles to easily fit them into their pockets (Smith 1982:88,90). *Vasa* seamen may have carved short handles onto their wooden spoons for similar reasons.

In addition to spoons, the *Vasa* sailors may have stored clay pipes in the pockets of their breeches. Archaeologists uncovered clay pipe fragments in close proximity to seven of the nine sailors. As previously suggested, smoking was a form of recreation on tightly packed ships. It seems unusual, however, that archaeologists found so many pipes aboard *Vasa* because, according to historical records, smoking tobacco did not become a common practice in Sweden until the end of the century. If current records are valid, these pipes may postdate the wreck;

they may, in fact, represent the trash of seventeenth-century salvage divers. Milled ring decorations along the rims of two bowls found near Cesar and a maker's mark on a bowl near Erik seem to confirm this. Both are typical decorations found on bowls post-dating 1640. Two stems have similar decorations, which could indicate that they also post-date *Vasa.* The remaining clay pipe fragments are nondescript stems or nondescript fractured bowls, which cannot be accurately dated. Yet, they were all located on the upper two decks or beneath hatches that led up to the upper decks, suggesting contamination is possible. Once *Vasa*'s sealed chests were unsealed, archaeologists supposedly found a couple of relatively well-preserved clay pipes inside. Yet, of the 160 clay pipes listed within the marketstore database, none are currently, directly linked to a chest. More detailed research of the pipes and the contents of chest is necessary to determine the extent of smoking aboard *Vasa*.

For safekeeping, the *Vasa* sailors carried around some of their money. The amount of money they carried ranged from a couple *öre* to a little over one daler. They probably carried their money in pouches, similar to the example found with Helge. Researchers discovered at least five additional leather or cloth pouches scattered across the ship, including a cloth pouch with 132 copper coins inside a personal barrel (W 19276). These coins represent portions of the sailors' monthly salaries, which amounted to roughly 126 *öre*. Before Gustav II Adolf gained power, naval salaries depended on the person, not his position. Gustav II Adolf reformed the payment system, ultimately creating a fixed monthly salary for each position. Typically, the salary was higher between April and October, but a few executive officers received the same pay year round. Although the government was supposed to pay the men monthly, seventeenth-century cash flow problems prevented this (Lybeck 1942:375-376). The men had little use for money while at sea, apart from gambling.

There are a few objects that the *Vasa* sailors had in their possession at the time of sinking that the average citizen would not regularly carry or in some cases even own. These objects comprise utilitarian items, or tools of the trade—mallets, awls, lanterns, and weapons. While all these items are necessary aboard a ship, making their association with *Vasa* sailors no surprise, the sailors, like their civilian counterparts, probably did not commonly carry these items. Rather, these items were in the sailors' possessions because they were using the items prior to the wreck or using them as the ship sank.

Mallets are a tool regularly employed by ship carpenters and shipwrights, along with anyone assisting the former, to strike chisels and drive in wooden pins, wedges, and treenails (McKewan 2005:299-317). Though mallets are used on shore, one would not expect to find a mallet in the possession of a person, particularly a member of the upper class, walking down the street or lounging about their homes. Exceptions would include individuals with professions that use mallets. Similarly, Swedes on shore (the exception being the cobbler and other's working with leather) did not regularly carry awls, tools used for shoe construction and repair (Grew and de Neergaard 2001:48-49) leather working, and sailmaking. Moreover, it is unlikely that the aristocrats, who purchased their shoes, even owned awls. Those on shore would, however, regularly use lanterns (O'Dea 1958:70-74), but, unlike a sailor who needs to make his way across the dark ship interior, those on shore only needed lanterns at night. Finally, muskets are typically associated with the military, not civilians. Thus, the only people on shore carrying muskets would be members of the army or navy—musketeers (Haythronthwaite 1983:29-30). The extravagant hunting rifle, on the other hand, is generally associated not to member of the army or navy specifically but to the elite levels of society. Both soldiers and elite citizens owned and carried swords (Draeseke 2009:12-14).

INDIVIDUALIZING THE SEAMEN

People use material culture to facilitate judgment, classification, and self-expression—to construct their cultural identities. By looking at the location of each individual skeleton and the style, design, utility, construction, material, quantity, and quality of the clothing garments, personal belongings, and utilitarian items for each individual separately, this section individually characterizes the nine sailors. In particular, it identifies the individual choices *Vasa* sailors made as they constructed and/or acquired these artifacts, noting similarities and differences between sailors. It considers what these various artifacts say about the person they were associated with.

Adam did not utilize the broadcloth that was likely allotted to him by the Navy Allotment System. Instead he chose to wear a homemade, plain-woven, undyed wool jacket with thread buttons and stockings. Adam also had a silk decorative band and a blue-dyed, decorative woven band, which was most likely connected to a pair of breeches. The use of homespun fabric and, therefore, the lack of imported material may indicate that Adam was not well off. On his person, Adam carried typical personal objects for a Swedish sailor. He carried at least one wooden spoon, which may have had a shorter handle for easy pocket insertion. He also had a knife inside a wooden sheath (personally marked), which may have been attached to a belt, and a leather bound book that would have fit easily into his pocket. Fourteen copper coins, amounting to 13-½ *öre*, were found near Adam, which is equal to about 1/9 of a common sailor’s monthly salary.

In terms of utilitarian items, a wooden cartridge tube was found near his remain, but the lack of a musket to use with the cartridge tube may be an indication that the tube was not actually associated with Adam. He had an awl, indicating he may have made his own shoes, worked leather, or helped with sail production. Adam also hand an unidentified tool. Depending on the function of the tool, he could have been working on the ship or some other related task at the time of sinking.

Cesar, similar to Adam, was not wearing broadcloth, which was supposedly allotted to Swedish sailors in 1628. Instead, he chose to wear a homemade, undyed, plain-woven wool jacket. The quality of this jacket may be an indication that we was not been well off. In addition to making his own clothes (or his wife making his clothes), Cesar may have made his own shoes, suggested by an awl found near his remains. Cesar also carried a wooden spoon with an elaborately carved handle and a leather bound book that could easily fit into a pocket. Cesar may have also had a pair of leather mittens or gloves, but given the fact that his remains were entangled with Beata's at the base of a ladder, they mittens may be hers instead. Their reason for having mittens in the summer is unclear, however. Although they appear cumbersome, perhaps Swedish sailors used the mittens for more than warmth. Maybe, for instance, they used them to protect their hands when working the ships rigging or completing other tasks on board. There is no evidence that mittens were stored near by.

David is the only seaman wearing a jacket made out of the material that was supposedly allotted to Swedish sailors in 1628. He wore a blue-dyed, plain-woven, broadcloth jacket that was probably imported. Two pewter buttons found in close association to the jacket may have served as fasteners. Three additional non-pewter buttons were also found near David. Another sailor could have lost these buttons, or they could have been stored in David's pocket, inside his small bentwood box. David probably also had at least one wooden spoon on his person, perhaps in a pocket. Two were found near his remains.

David is the only recovered seaman who had a silver coin, which was far more valuable than copper coins. In addition to the silver coin, as previously stated, he was found near 48 copper coins, amounting to 49-½ *öre* or 7/18 of a common sailor's salary. Given the weight of copper coins, David would have either needed a change purse or some of these coins were not actually his. If he had a change purse, it may have been connected to a belt made out of the leather strap found near his remains. He was also found with a wooden knife, which could have been attached to the same belt

In addition to a large quantity of coins, David was found near a number of leather mitten fragments, including at least two nearly complete left-handed mittens and a nearly complete right-handed mitten. One pair of the mittens may have actually been David's, but given the fact there are multiple mittens for the same hand represented, it is unlikely that all of the associated fragments are his. It would be interesting to do an experiment to see how well leather mittens float, as they seem to be scattered throughout the ship even though it sank during a summer month. This, again, may be an indication that Swedish sailors used leather mittens for not only warmth but also work. Perhaps David was wearing the mittens when using the wooden mallet found near his skeleton.

Though his remains were largely scattered, it seems likely that Erik, similar to Adam and Cesar, was wearing a homemade, plain-woven, undyed wool jacket. He, similar to the other two sailors, was not using the allotted broadcloth. Two brass buttons were found near Erik's remains, but given that they were on a higher deck than his jacket and that the jacket has iron, not brass metal staining, the buttons were probably not fasteners for Erik's specific jacket. Seventeen coins were also found near Erik's remains, amounting to 15-½ *öre*, a little more than 1/9 of a sailor's monthly salary. He was also found with a wooden spoon with a short handle, which could have been easily slid into a breeches pocket.

One nearly complete mitten was also found with Erik's remains, suggesting he may have had a pair on his person at the time of sinking. The mitten was not found near his hands, one of which was found on the upper gundeck and other of which was found on the orlop. Instead it was on the lower gundeck. Given how scattered Erik's remains are, this does not mean the mitten was not his. Rather, it seems to suggest he was not wearing the mittens on his hands at time of death. The sailors likely had a way of attaching their mittens to their person when not using them.

Archaeologists discovered Filip near the ship's whipstaff. Researchers have long believed Filip was an able seaman on duty at the helm at the time of sinking, but he could have just as easily have been a seamen or even an officer making his way up the ladder out of the steerage compartment. His jacket, although coarse and undyed, is twill woven. At the very least, this would have required more time to make. He fastened the jacket with twelve glass buttons, which according to archaeological studies were not common during the seventeenth century. Rather most buttons were made of metal or thread. As such, glass buttons are usually linked to the wealthy and thus, higher status. Yet, Filip also used the more common hook and eye fasteners, as evidenced by a brass eye associated with the jacket. Filip's clothes also included a fancy silk ribbon and a fragment of a felt hat, both of which were more costly and are often associated with those of a higher class. He only had around 10 copper coins, amounting to 11 *öre* on his person at the time of sinking. Similar to may other sailors, Filip is associated with a wooden spoon and a knife with a wooden handle. The knife was found in association with a wooden knife sheath with decorative carvings. There is evidence that the sheath may have been connected to a belt of some sort.

Filip was also found near an elaborately constructed sword, sword sheath, and baldric. Aboard a naval ship, the sword reinforced rank. On *Vasa,* there were two types of swords. While the crew's swords had roughly carved spiral grips with little symmetry or attention to detail, the officers' swords had grips that were expertly carved and wrapped in decorative wire patterns (Draeseke 2009:17,90). Filip's sword was officer quality. If this was in fact Filip's sword, then Filip is probably not the helmsman after all; he is more likely a petty or warrant officer, who had other duties beyond steering the ship. In addition to the sword, Filip was found near the remains of a wooden slamlock hunting rifle and flint. Hunting rifles, at least of this quality, are generally associated with the wealthy. The find number for the rifle is sequential with the sword find number, suggesting that they were found one right after the other. They do seem to belong together, as they have broadly similar functions and status connotations. If the sword and hunting rifle were together, it seems that Filip, a sailor of affluence and perhaps an officer, may have been grabbing his most valuable possessions and attempting to escape the ship when he died. This is one of the few explanations for a sailor having the two high quality materials on him as the ship sank, and it seems feasible given his location near the base of the stairs leading out of the steerage compartment.

Helge, one of the most famous skeletons, was trapped underneath a cannon at the time of sinking. He was probably trying to close the gunports. Helge was not wearing a jacket made of the probably blue allotted broadcloth, nor was he wearing a homemade jacket. Instead, Helge had on a twill woven, yellow-dyed jacket and plain woven, yellow-dyed 'cloak bag breeches.' He was also wearing a simple pair of tie shoes. Considering the quality and color of the garments, Helge may have imported the cloth and had a tailor construct his outfit. These garments suggest a man of higher wealth, perhaps higher status. They could also indicate

Helge's taste for more expensive clothing. Helge also had a large sum of money—33 coins worth 31-½ *öre*, about ¼ of a common sailor's salary—which he carried in a leather pouch. Inside his breeches pocket, he carried a knife with a wooden handle, topped with a bulb-shaped decorative bone pommel. The blade of the knife would have slid into the leather knife sheath, also found in his breeches pocket.

Archaeologists found Ivar in a closed compartment on the orlop. He was carrying a military-issued, flintlock musket, and had a wooden ramrod, gunpowder horn, and lantern. Perhaps the commissioned officers assigned Ivar the task of guarding the small room, which contained rigging and the gunner's stores. Since soldiers were not on board, Ivar might have been a trusted, able seaman. This might mean he was a petty officer. In terms of clothing, Ivar is the only one in this study who does not have a jacket associated with his remains. There were fragments of a leather glove found near by, which could have been his, and there was a decorated silver button, which could be a remnant from his clothes. Finally, there was rolled brass thread found near his remains, but its utilization and direct association cannot be determined.

Excavators found the remains of Johan, a scarred old man, relatively well localized in the ship's hold. Finds associated with Johan included remnants of a high quality, fine twill-woven, blue-dyed, broadcloth jacket. This jacket is one of the finest pieces of clothing found aboard. Unlike the other jackets found associated with human remains, it is a long waisted woolen jacket. Johan probably bought imported cloth and had a tailor construct the garment. The cut and cloth of this jacket suggests that someone with wealth purchased it, possibly someone of higher status who had more money to throw around. Johan is also the only seamen wearing half-slippers instead of tie shoes. Their scarcity may be an indication of their worth. Johan might be Captain Hans Jonsson, the only commissioned officer that died aboard *Vasa*. Perhaps Captain Jonsson was checking on the hold's water content, when he was overwhelmed by the incoming water and drowned. A lantern found near-by might confirm this story.

Finally, Ludwig had on a homemade, plain-woven, undyed wool jacket and plain-woven wool 'cloak bag breeches' with blue-dyed woven bands. None of these garments were constructed from the materials supposedly allotted to the sailors. Ludwig was also wearing plain-woven, undyed, coarse stockings and probably either leather mittens or leather gloves. Considering the quality of these garments, Ludwig, similar to Adam, Cesar, and Erik, would not have spent much money making or buying them. He does not appear to have been affluent. In addition to his clothes, Ludwig was found with a wooden knife handle, one copper coin (1 *öre*), and a large wooden mallet. The mallet, like the other tools found near human remains, may suggest that he was working on the ship or some other similar task when the vessel sank.

In looking at the associated clothing and personal possessions of the nine deceased sailors, it is evident that there are modifications or tweaks being made to a set style. While the eight sailors found with jackets are all wearing the aforementioned generalized suit, they are varying the weave quality, color, and construction methods. They are personalizing their clothes—communicating a message about who they are. Similarly, by using different designs and applying different carvings to their knife handles, sheaths, and/or spoons, they are individualizing their personal possessions, incorporating their identities into their objects.

AN INTERNAL SOCIETAL COMPARISON

According to military historian Nathan Joseph, "the uniform is possible only after an organization has become permanently differentiated from other groups" (Joseph 1986:35). Laborers develop a standardized dress according to the expectations, pressures, and demands of their trade or occupation (Joseph 1986:36; Storm 1987:136). During the early seventeenth century, the Swedish navy conscripted men from rural and urban communities. These potentially inexperienced men represented a majority of the sailing crew. The navy only maintained a few skilled Swedish seamen and foreign seamen (Glete 2009:598-599). As newcomers to the trade, the Swedish sailors aboard *Vasa* lacked the time and experience needed to differentiate themselves from their rural and urban origins, their identities within wider Swedish and European society; they had not yet developed an occupational identity, or a 'maritime culture.'

This continuity with those on land, or reproduction of the known, is most evident in the sailor's attire. Seventeenth-century Swedish sailor fashion—the combination of a linen shirt, drawers, a jacket, knee breeches, stockings, a pair of tie shoes, a close-fitting woolen cap or a large felt hat, and a pair of mittens or gloves—as represented on *Vasa*, closely resembled civilian fashion, both aristocratic and peasant. The sailors, like those on land, wore a French, German, and Dutch style combination. The only major differences lie in the quality of materials used to make the garments. The seamen had not yet developed dress suitable for warfare and the daily chores of a ship. For instance, they did not realize the awkwardness of 'cloak bag breeches' in climbing a ship's rigging. They dressed like civilians because they were civilians. They were merely civilians who were forced into working on a ship. Therefore, unlike their nineteenth century counterparts, seventeenth-century Swedish sailors could not be picked out from a crowd walking along the streets of Stockholm.

This trend continued into the late seventeenth century. Late seventeenth-century fashionable attire included long, straight coats over inner coats or waistcoats and simple knee-length breeches. The clothing found aboard *Kronan* resembled this fashion (Einarsson

1997:214). Even after Sweden adopted military uniforms in the 1740s, they adapted the uniform to resemble civilian fashion. For instance, when the tailcoat became popular during the late eighteenth century, the navy and army adopted this article of clothing as a part of their standard uniform (Karin Teeteris 2010, pers. comm.).

As the *Vasa* sailors were striving, perhaps unconsciously, to maintain continuity with their homeland, with civilian life, they were bringing their individual identities within that wider Swedish and European society with them on to *Vasa*. Their individual identities and interests are demonstrated in the ways they adopted, changed, and at times rejected aspects of the standard civilian style of dress. In this particular case, they demonstrated their individual agencies by tweaking styles to fit their class identities, their statuses within the larger Swedish society (*See* Beaudry *et al.* 1991:159). Thus, unlike the sailors of Victorian Britain and some would argue late-seventeenth-century Sweden (Einarsson 1997), the *Vasa* sailors' identities are more closely linked with the social structure of wider Sweden than with a distinctive social hierarchy aboard the ship. Their agency, in this case, is both limited and enabled by their broader social relations (McGuire and Wurst 2002:89). A ship social hierarchy is not revealed in this study; no sailor can be definitively called an officer. While some of the sailors, primarily Johan, can be linked to money and seem to identify with the upper class, one can only say they might be officers, not that they are.

The set style that the sailors are modifying is a part of Raymond Williams' (1997:110) 'cultural hegemony,' the whole body of practices and expectations—ideologies—reigning over a culture, or the sense of reality for most people in a society. Class relationships require the negotiation of these ideologies, this cultural hegemony, suggesting that all classes play creative, active roles in the social process. Thus, cultural hegemony is never complete, as new alternatives and oppositions continually arise (Beaudry *et al.* 1991:159, 165-166).

With this in mind, the design and basic structure of lower classes garments were identical to the garments of Swedish aristocrats, but the lower classes, probably influenced by their lack of wealth (Roach-Higgins and Eicher 1995:14), chose to use fabrics of a lower quality material—frieze, or homespun wool. Likewise, the lower classes primarily wore homemade clothes and did not employ tailors, as did the Swedish upper class. These same variations are visible on board *Vasa*. Although the Navy Allotment System of Sweden supposedly provided the same variety of cloth to every seaman, the seamen did not all wear the same cloth. Four of the sailors wore cheaper homemade, plain-woven, undyed jackets, jackets generally associated with the lower class in Northern Europe. These sailors—Adam, Cesar, Erik, and Ludwig—chose to wear a style representative of the lower class. In other words, they chose to identify themselves with the lower to middle class. Comparatively, Filip, Helge, and especially Johan chose to spend more money on their jackets (and breeches in the case of Helge). While Filip paid for a higher quality weave and 12 glass buttons for his jacket, Helge paid for a higher quality weave for his jacket and a yellow dye for his jacket and 'cloak-bag breeches.' Johan paid for the nicest quality jacket found aboard *Vasa*, a close-fitted, long waisted, twill-woven, blue-dyed, broadcloth jacket. Thus, he paid for the cut, quality of weave, dye, and manufacture of his jacket, suggesting affluence. These three men chose to identify themselves with the upper class. In the case of Filip and Helge, it is possible that they were not affluent, and thus not actually members of the upper class, but merely spent a large sum of their pay on increasing the quality of their clothing. Yet, by making the choice to alter the quality of their materials, or revamp the style of their clothes, they are identifying with upper class lifestyle.

Now, it would be easy to adopt a dominant ideology thesis, as did Penny Storm (1987:173-174), claiming that the highest class in Swedish society adopted the fashion, and then, wanting to move up in rank or appear of a higher rank, lower class citizens mimic the fashion. As the fashion trickles downward, garments are constructed of cheaper, lower quality materials and made with inferior workmanship. In this model, Swedish peasants, including the lower status sailors, are emulators, who adopted aristocratic fashion en masse. The problem with such a model is that it denies so-called subordinate groups agency, the ability to formulate and reject ideologies. Lower classes could have just as easily have been the trendsetters, making the aristocrats the emulators. Just because a class has economic and political power does not mean that they have total social and cultural power (Beaudry *et al*. 1991). In the words of sociologist Diana Crane (2000:15), "consumers are no longer perceived as 'cultural dopes' or 'fashion victims' who imitate fashion leaders but as people selecting styles on the basis of their perceptions of their own identities and lifestyles." The crewmembers of *Vasa* who identify with the lower class, and those who identify with the uppers class maintained equal opportunity to control fashion by consensus versus coercion.

AN OUTWARD COMPARISON OF SAILORS

The Swedish sailors did not have a 'maritime culture,' a strictly occupational identity largely because the Swedish Navy had more inexperienced civilians turned sailors than experienced mariners. These new sailors had not yet found the time to develop an identity away from shore. While Swedish conscription methods tried to get men that had maritime experience, even if they were younger or older than the set conscript age, they largely failed. One reason for their failure was the newness of 'the navy' as a separate department in the central administration.

Gustav II Adolf was in the process of restructuring the navy and giving it a greater role politically, which meant more sailors than ever before were being recruited. There were also fewer civilians with maritime experience because the Swedes had not really begun to explore the world outside the Baltic Sea and European coastline at this point; there were fewer ships to gain experience on. This lack of a full-fledged, separate 'maritime culture,' is not shared amongst all European seamen of the same period.

Historical accounts, including seamen's diaries and a detailed list of the contents of one illiterate seaman's chest, allowed historians to clearly define the dress of late-sixteenth to early-seventeenth-century Spanish seamen. The Spanish *sair* had a distinctive style of dress. The rigid and dignified elegance of Spanish fashion, previously mentioned, did not meet the needs of an active sailor. Contemporary Spanish costumes were tightly fitted and contained too many adornments. To climb the rigging, sailors preferred to wear loose clothing. Typically, they wore a blouse or a black or blue *sayuelo*, a woolen jacket with skirts that tied at the waist, and linen or woolen *zaragüelles*, wide pants that fell from the waist to the knee (Figure 62). For foul weather, the Spanish seamen had *capotes* (capes) and a red *bonete* (woolen cap). While on shore, officers employed a combination of sailor garb and elegant parliamentary dress (Pérez-Mallaína 1998:145-150). Spanish sailors had, thus, already adopted a separate 'maritime culture' by the sixteenth century. This may be a byproduct of Spanish conquests to the New World. Unlike the Swedes, who were still confined to the Baltic Sea and European coastline in the early seventeenth century, the Spanish had been sailing across the world for over 100 years and establishing foreign settlements since the early sixteenth century. The Spanish sailors had the time and space to differentiate their fashion from that of Spanish civilians.

Figure 62: Spanish sailors of the sixteenth century wearing specialized martime attire (Pérez-Mallaína 1998:iii).

While the Spanish had developed a distinct maritime dress, the English, Dutch, Germans, Italians, and French, like the Swedes, maintained styles reflective of, or characteristic of, their parent cultures—civilian attire (Wilcox 1963:33). The basic attire of the English sailor during the early seventeenth century, for instance, is known from 1628 Admiralty reports. In 1628, the Admiralty decided to issue ready-made clothes or slops to pressed men. After experiencing several epidemics across the fleet, they hoped the slops would decrease health problems aboard royal ships. The slops included a canvas doublet, canvas knee breeches, a Monmouth cap, a cotton waistcoat, drawers, stockings, linen shirts, and leather shoes. The slops were undyed. The British Admiralty ordered 5000 suits and, restrained by the corrupt pursers, sold 500. By

1663, pursers sold slops at a fixed price once a week in the captain's presence (Llyod 1968:63-64; de Marly 1986:37-38).

Dutch seamen, as evidenced by period artwork (Figure 63), wore the same sorts of clothes, as did the German, Italian, and French sailors according to costume historian R. Turner Wilcox (1963:33). With the exception of the Monmouth cap, which may be the only distinguishing component of seamen dress, most seventeenth-century European civilians also wore some variation of the same outfit (See Chapter 4, this text). The

Figure 63: Dutch Seamen, wearing the same sort of clothes as the British. From Johannes van Keulen's New Great Shining Torch of the Sea, 1682 (Llyod 1968:48).

English, Dutch, and French delay in adopting strictly maritime attire, as compared to the Spanish, may stem from the fact that they, like the Swedes, began their major explorations and colonization over 50 years later, at the end of sixteenth and beginning of the seventeenth centuries. They had not yet found the time to differentiate their fashion from that of European civilians. On the other hand, the Italian and German pause in adopting strictly maritime attire may relate to their very limited exploration and colonization during the sixteenth and seventeenth centuries.

CONCLUSIONS

Based on the identification, cultural analysis, and evaluation of 277 artifacts found in association with the human remains recovered from the Swedish warship *Vasa*, the average working suit manufactured by a seventeenth-century Swedish sailor included: a linen shirt and drawers, a close-fitted, hip-length woolen jacket with fasteners along its right front panel edge, 'cloak bag breeches,' perhaps decorated with a woven band along each leg's outer seam, stockings tied up with decorative ribbons, greased up tie shoes, a cap, and gloves or mittens. The seamen carried a wooden spoon with a shortened handle, one or more clay pipes, and possibly a book inside their breeches pockets, and they had a pouch of coins and a small knife in their pocket or attached to a belt or shoulder strap. Though not a part of the daily sailor gear, several of the sailors found aboard *Vasa* also carried a mallet, awl, lantern, sword, and/or musket.

The *Vasa* sailors used their material culture to generate, manipulate, and negotiate their cultural identities. By looking at the location of each individual skeleton and the style, design, utility, construction, material, quantity, and quality of the clothing garments, personal belongings, and utilitarian items found with each individual, sailors were characterized. They all dressed according to a set style, a 'cultural hegemony,' but they modified the style to fit their needs. The set style was not a uniquely sailor style, however. Rather, it linked the sailors with civilian life; the set style was the same one used by all Swedes and most Europeans. The sailors, mostly inexperienced conscripts, had not differentiated themselves from their rural and urban origins. They had not yet developed a separate maritime culture, an occupational identity.

Modifications to the standard civilian dress included changes in the weave, color, and construction of clothes. These differences were a byproduct of the sailors' individual agencies. The sailors modified their styles to fit their class identity, as did the civilians ashore. They negotiated the 'cultural hegemony' of Sweden, accommodating their interests, circumstances, and needs. Their identities are, thus, more closely linked with the social structure of wider Sweden than with a distinctive ship social order. In general, those that identified with the upper class wore tailored clothes made with broadcloth, while those that identified with the lower classes wore homemade clothes made with frieze, but there were various adjustments constantly being made. In a sense, fashion was an outcome of consensus, not control.

It is evident that the Swedish seamen of *Vasa* had not yet differentiated themselves from their rural and urban origins. Seventeenth-century English, Dutch, German, Italian, and French sailors shared this lack of an occupational (sailor) identity, as reflected in their daily attire. All of these sailors wore their nation's version of the aforementioned outfit. On the other hand, by the seventeenth century, Spanish sailors had developed a distinctly maritime dress. For instance, they wore long pants (versus baggy knee breeches) that were less likely to get stuck in the ship's rigging. The Spanish most likely adopted a maritime-specific outfit earlier than other Europeans because they, unlike the Swedes, English, Dutch, Germans, etc., had already been sailing across the world for over 100 years by 1628. They had the time and space to differentiate their fashion from their satellite culture.

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

Chapter one of this thesis laid out seven clear research questions: 1) What did the typical *Vasa* mariner wear and have on his person on a regular basis aboard the ship? 2) Why might he have had these materials? 3) How would he have obtained the artifacts—government issued or personal? 4) Did a sailor require certain objects to be nearby, which the average citizen did not even own? 5) Is a social hierarchy revealed by the seafarers' attire and belongings? 6) Are the sailors' appearances reflective of 1628 society or do they maintain their own style of dress, their own 'maritime culture'? 7) How does the *Vasa* 'maritime culture,' or lack there of, relate to other nations, such as Spain and England? To answer these seven research questions, the remaining chapters in this thesis discussed the historical context of the ship and its crew and the process of wrecking; outlined the project's methodology, which was based on material culture theory and previous maritime studies; presented a complete analysis of all artifacts found in association with the human remains—clothes and accouterments; and made interpretations about the Swedish sailors and their places within Swedish society and European maritime culture based. The findings are summarized below.

Chapter two analyzed Sweden's social, political, and economic structure and the development of Sweden's navy. Seventeenth-century Sweden was clearly a fiscal military state, with a centralized power system that sold protection against violence. During the reign of Gustav II Adolf, Sweden was trying to prove its strength before the world. It maintained the most effective army in Northern Europe and a navy that could match those of other Baltic powers (Glete 2002:10-15). Gustav II Adolf had started restructuring the fleet following a peace treaty with Denmark-Norway in 1617. He made the navy a more effectual and concentrated force by advancing the quality of the fleet, augmenting the crew's discipline, and equipping vessels with skilled leaders (Lockhart 2004:35). Therefore, as a part of this reform, Gustav II Adolf established the first permanent officer corps, permanently retaining enough naval leaders to maintain a mobilized fleet. Naval leaders were divided into a three-tiered system of leadership, consisting of petty officers, non-commissioned officers, and commissioned officers, but only the latter two were part of the permanent officer corps. To build up the number of domestic seamen and soldiers, the king also issued a new conscription order, requiring all men between 15 and 60 to register for military service. Those registered were broken into groups of 10-20 men, and during conscription, one man from each group was drafted into the army or navy (Glete 2010:598-609,627). A final component of Gustav II Adolf's restructuring of the navy was the construction of large warships—the shift from a small ship navy to a large ship navy. As a part of this, on January 10, 1625, the king ordered the construction of two, two-decked men-of-war with heavier guns (Hocker 2006:41-42). The first of these was the *Vasa*.

In addition to this historical context, the second chapter defined the archaeological context of *Vasa* and its associated artifacts. The nearly complete *Vasa* was launched in the spring of 1627. Then, in early 1628, she was assigned to a squadron based at Ålvsnabben. On August 10, 1628, the *Vasa* and little more than half of its crew, roughly 133 men, set sail for Ålvsnabben. Just past the Söder Cliffs, a gust of wind caused the ship to heel to port, and though the helmsman was able to right the ship once, it ultimately heeled so far to port that water began pouring into its lower gunports. The *Vasa* could not handle the windy weather because of its combined draught and tonnage. It foundered and came to rest on the bottom of the harbor at a high list. At least thirty people, including one commissioned officer, lost their lives (Hocker 2006:44-60). Salvage attempts were made throughout the seventeenth century, with the intent of recovering the cannons, and the *Vasa* was damaged during the mid-nineteenth century salvage of the Swedish warship *Riksäpplet* (Cederlund 2006a:121-125; Hafstöm 2006:68-107). All of these factors, including the wrecking event, affected the site formation processes.

Knowledge of the ship's location was subsequently lost, until Anders Franzén and Per Edvin Fälting rediscovered the wreck on August 25, 1956 (Cederlund 2006a:139). Following this discovery, the *Vasa* was recovered from the harbor bottom, floated into a dry dock, pumped out, and fully excavated by a team of archaeologists, using a hose with a pistol nozzle (Cederlund 2006b:217-300). This completely altered the original archaeological context of the vessel, so all present research must rely on the daily site diaries, find logs, photographic documents, plan and perspective drawings of find environments, personal accounts, and journals of the original eleven archaeologists and two museum staff. They uncovered 14,034 artifacts, but these were not all discrete.

Taking into account recent Bioarchaeological research (Hocker 2003:3), seventeen human remains were among the uncovered artifacts. Thirteen remains were found inside the ship, and four were found outside the ship. Excluding Beata, Cesar, and Erik, whose skeletons fell downward through the hatches as salvagers cleared the upper gundeck, the individual's locality at death and their position on recovery most likely coincide because of the unique Baltic environment. As the bodies decayed, their associated belonging may have shifted slightly but they can still be identified as that individual's personal belongings. In such a context of use, the relationship between skeletal remains and nearby artifacts, the primary question of this research, could be examined and interpreted.

Moving beyond context, chapter three considered material culture theory, the theoretical foundation of this thesis, and outlined the methodology derived from it. Material culture or artifacts encompass all objects modified or made by humans, which act as the primary source for cultural information. Studying artifacts allows material culturalists to identify with another culture with their senses as well as their minds. By studying material culture, an archaeologist can understand an object's commissioner, producer, and employer. Objects carry meaning, or communicate messages, as part of a network of relations; social actors meaningfully constitute objects (Dellino-Musgrave 2006:60-65). Thus, people communicate who they are and what they are doing, their cultural identities, through artifacts, such as clothes, and these identities are linked to the individual's position within a social structure. Yet, there are three problems with studying material culture. First, material culturalists are only studying the surviving data not all the data. Second, artifacts are only fractions of what they once were, and third, material culturalists bring a bit of themselves into their interpretations.

In addition to theory, chapter three considered previous material culture studies. Maritime archaeologists have studied the shipboard life of numerous vessels. Most studies interpret ship life from the artifacts scatted across the decks or the artifacts found inside barrels or chests. Only two studies have considered artifacts associated with human remains, the studies of *La Belle* and *Mary Rose*. Both studies encountered problems. While *La Belle* only had one intact skeleton, *Mary Rose* had numerous skeletons located in the same confined area. This research applied the basic technique used to characterize Mr. Barange found on board *La Belle* and Matthew Benckle's idea of placing the seamen's attire from one ship within the larger framework of shipboard society.

Based on these studies and material culture theory, the methodology of this thesis included three stages of data collection and two interpretive stages. Data collection involved classifying artifacts, determining their historical context, utilization, and distribution of those artifacts, and creating a generalized inventory of what the *Vasa* mariners wore and had on their person aboard the ship. In terms of interpretation, the generalized components of a mariner's attire and belongings were compared to each other and to the clothing and personal possession of seventeenth-century Swedish aristocrats and peasantry and other seventeenth-century European sailors.

Chapter four considered the clothing fragments found in association with *Vasa*'s human remains in light of seventeenth-century Swedish fashion, which combined the Baroque, courtly styles of France with the moderate, middle-class fashions of the Dutch and Germans. Following a general description of the history and genealogy of each component of a basic outfit, the archaeologically recovered garments were examined individually. Early seventeenth-century sailor fashion was nearly identical to early seventeenth-century civilian fashion. It was simple in design and form and included linen shirts, drawers, doublets (or jackets), knee breeches, stockings, shoes, hats, and mittens or gloves. The only differences stemmed from the sailors class not occupation. Lower class garments, including those of lower class sailors, were homemade with cheaper, lower quality homemade woolen fabric called frieze. Meanwhile, the upper class (higher ranking) sailors purchased imported, mass-produced woolen cloth called broadcloth and hired tailors to produce their garments.

The organization of chapter five was the same as chapter four except instead of sailor wardrobe, it considered the personal belongings that the average seventeenth-century person carried on their beings at all times and the utilitarian items they were evidently using just before or during the wreck. These personal possessions included spoons, knives (usually in a sheath), combs, coins, keys, books, and pipes, while the utilitarian items included mallets, awls, lanterns, muskets, and swords. Following a general description of the history and genealogy of each item, the archaeologically recovered possessions and utilitarian items were examined individually.

From this research, it became evident that the personal possessions that sailors regularly carried in their pockets, pouches, and bags and on their belts, similar to their wardrobe, differentiated the sailors by class.

Chapter six expands upon these initial interpretations about class, answering the original seven research questions. The typical *Vasa* mariner's daily wardrobe consisted of a linen shirt and drawers, a close-fitted, hip-length woolen jacket with 12 fasteners along its right front panel edge, 'cloak bag breeches' decorated with a woven band along each leg's outer seam, stockings tied up with decorative ribbons, greased up tie shoes, a felt hat, and gloves or mittens with a knitted wool interior and a leather exterior. The sailors were allocated cloth by the government based on their rank, then they either homemade their outfits or paid a tailor to construct them. Attached to a belt or baldric, typical *Vasa* sailors had a pouch of coins, kept with them for security purposes, and a small knife inside a sheath, used for cutting and eating. Inside their breeches pockets, they carried a short wooden spoon for eating, pipes and books for recreation, and keys, possibly for their sailors' chests, for safekeeping. All of the above personal items were purchased or handmade by the sailor. Several of the sailors found aboard *Vasa* also carried a mallet, awl, lantern, sword, and/or musket. These items are utilitarian and would have not been regularly carried by a sailor or average citizen.

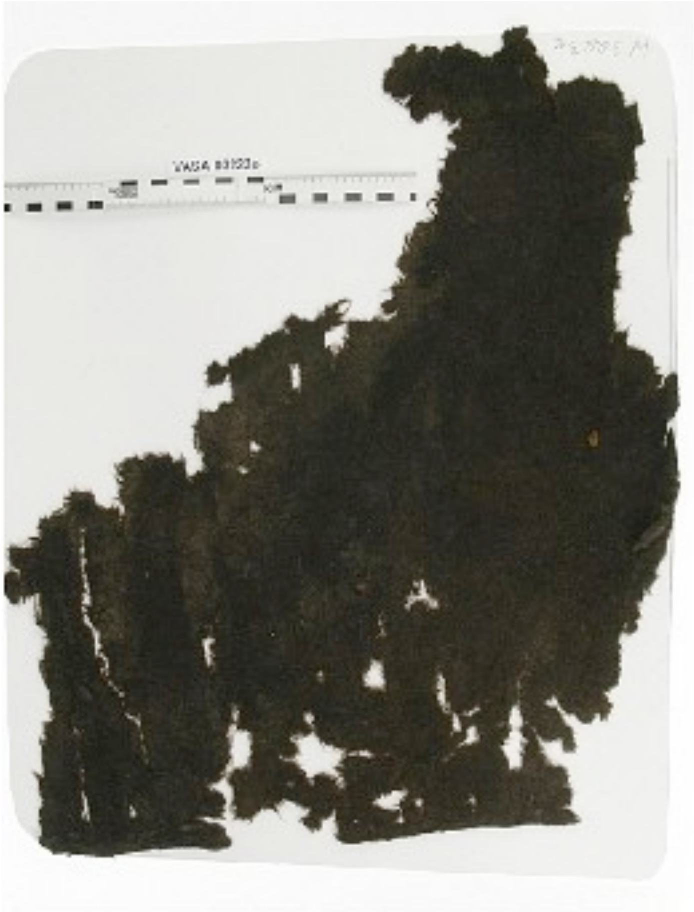
The *Vasa* sailors used their appearance to generate or reinforce cultural identities. In this section, the sailors were individually characterized by looking at the location of each skeleton and the style, design, utility, construction, material, quantity, and quality of the clothing garments, personal belongings, and utilitarian items found with each skeleton. They all dressed according to a set style, a 'cultural hegemony,' but they modified the style to fit their identities. The set style was not a uniquely sailor style; it was a reproduction of the known. It was the same one used by all Swedes and most Europeans. The sailors, mostly inexperienced conscripts, had not differentiated themselves from their rural and urban origins. Their appearances were reflective of 1628 society. They could not be picked out of a crowd walking down the streets of Stockholm in 1628 because they did not yet maintain a separate 'maritime culture,' an occupational identity.

Yet, not all outfits were constructed with the same weave, color, and construction methods. These differences were a byproduct of the sailors' individual agencies. They negotiated the 'cultural hegemony' of Sweden, accommodating their interests, circumstances, and needs. More specifically, the sailors modified their styles to fit their class identities. These identities are more closely linked with the social structure of wider Sweden than with a distinctive ship social order. Thus, a social hierarchy was clearly revealed by the quality of the seafarers' attire, but not a special ship hierarchy. Two categories of clothing existed on the *Vasa*, a simple, cheaper outfit and a richer outfit. In general, those that identified with the upper class wore the richer outfit, which included a tailored, twill-woven, typically dyed, wool jacket. Meanwhile, those that identified with the lower classes wore the simple, cheaper outfit, which included homemade, plain-woven, undyed clothes. Just because a sailor could afford the rich outfit did not necessarily mean he was a wealthy upper class citizen, rather it meant he was willing to spend the majority of his money to dress in upper class fashion. He identified with the upper class.

It is evident that the Swedish seamen of *Vasa* did not yet maintain their own style of dress, their own 'maritime culture.' Noting their basic maritime attire, seventeenth-century English, Dutch, German, Italian, and French sailors also lacked occupational identities. All of these sailors wore the same basic attire as their civilian counterparts. Alternatively, Spanish sailors had developed a distinctly maritime dress by 1628, wearing items like long breeches instead of bulky knee breeches. The Spanish most likely adopted a maritime-specific outfit earlier than other Europeans because by 1628, they, unlike other countries' sailors, had already been sailing across the world and settling foreign lands for over 100 years. This provided them with not only the time but also the space to differentiate their dress from that of Spanish civilians. One way to clarify this interpretation would be to analyze the sailor clothing from another country that began exploring the world in the early to mid 1500s, the Portuguese.

This study has suggested that seventeenth-century Swedish sailors did not have a distinctive style of dress or unique personal belongings. Instead, the quality of the items on board depended on the seamen class identities, their identities with the larger Swedish and European society. It should be noted, however, that this study only examined the clothing and belongings of nine seamen. The results and conclusions of this study should be carefully examined within a larger test sample. The methods of analysis should also be applied to other historic shipwrecks for comparison. *Vasa* sank on its maiden voyage, so its artifacts may not represent seventeenth-century Swedish warships as a whole. In addition, this study only considered the clothing and personal belongings found in association with human remains. Other items were stored in chests and barrels across the ship. A more comprehensive investigation of the ship may contribute to or contradict these findings.

PLATES



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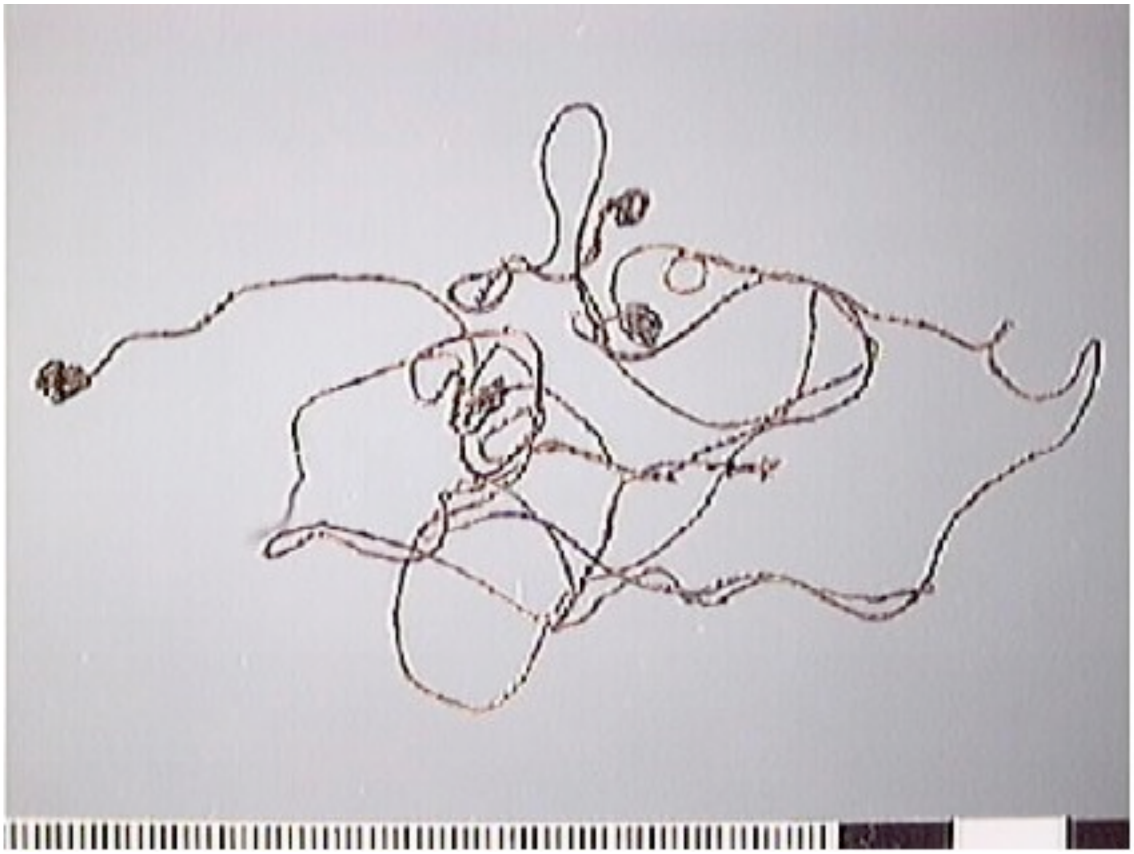

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Plate 76. Hunting Rifle Butt Fragments, W 10116, Vasamuseet, Photo by author.

Plate 77. Musket Stock, W 10689, Courtesy of Vasamuseet.

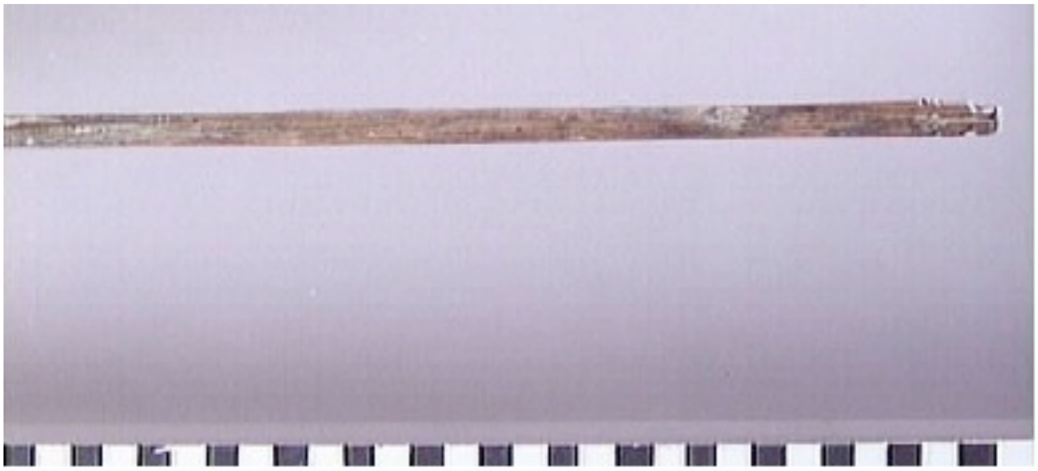

Plate 78. Musket Butt, W 30503, Courtesy of Vasamuseet.

Plate 79. Musket Fore Stock, W 17031, Courtesy of Vasamuseet.

Plate 80. Wooden Ramrod Fragment, Featuring Conical End, W 30505, Courtesy of Vasamuseet.

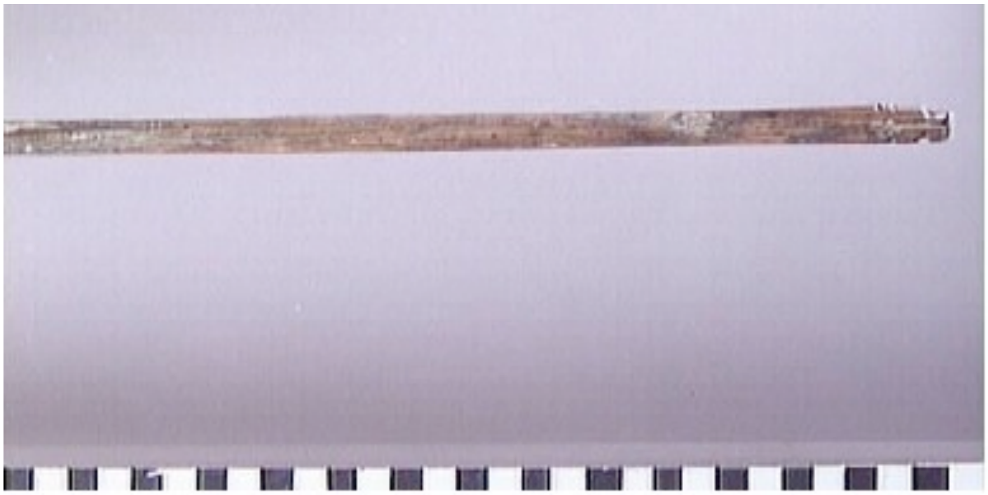

Plate 81. Wooden Ramrod Fragment, Featuring Flat End, W 30505, Courtesy of Vasamuseet.

Plate 82. Powder Horn, W 19536, Courtesy of Vasamuseet.

Plate 83. Powder Horn Lid, W 19537, Courtesy of Vasamuseet.

Plate 84. Three Lead Musket Balls, W 17091, Courtesy of Vasamuseet.

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APPENDIX A: SHOES

Leather shoes found in association with the human remains aboard *Vasa*

Shoe Type	***Find No.***	***Association***	***Exact Location***	***Components Represented***	***Noteworthy Features***
Tie Shoe	03225	Adam	ÖB, SB, Beams 5-6	Two uppers, three sole fragments, a heel patch, and 35 additional fragments	All fragments except the insoles are sticky. The uppers each have two eyelets.
Tie Shoe	08943	Adam	ÖB, SB, Beams 5-6	40 fragments, including soles, vamps, heels, toe insertions, and the quarters	Two soles have outer edges with holes for stitching and spherical incisions on their sides. Some thread is preserved. Heel flaps have holes for wooden pegs.
Tie Shoe	03258	Beata	ÖB, BB, Beams 5-6	A partially assembled shoe with soles, vamps, and quarters with straps	The side panels are connected directly to each other, creating openings along the side. The top has two eyelets. The end of the strap hole also has an eyelet. Soles have holes for wooden pegs.

Shoe Type	***Find No.***	***Association***	***Exact Location***	***Components Represented***	***Noteworthy Features***
Cannot be determined	04267	Beata	MS, Beams 5-6	Shoe Bottom—4 soles and 40 additional fragments, including toe insertions, insoles, and heel flaps	This find probably represents two different shoes.
Tie Shoe	07733	Beata	ÖB, BB, Beams 6-9	A fragmentary outer sole, a triangular shaped back panel, and a sole fragment	The outer sole has a line of stitching and wooden peg holes along its outer edge and three peg holes in its center. The leather panel has stitching holes along two sides.
Tie Shoe	07615	David	ÖB, SB, Beams 14-15	100 shoe fragments, including the vamps, soles, quarters, heel flaps, a leather lace, and toe insertions	Probably represent multiple shoes. Eyelets are present on the uppers. The two sides are short and fragmentary Wooden pegs are still located in several sole fragments, along with stitching holes

Shoe Type	***Find No.***	***Association***	***Exact Location***	***Components Represented***	***Noteworthy Features***
Cannot be determined	07630	David	ÖB, SB, Beams 14-15	Heel of a Shoe	Made of leather and wood.
Tie Shoe	07647	David	ÖB, SB, Beams 14-15	30 fragments of a shoe, including a heel, soles, vamps, and toe insertions	Extremely fragmentary
Cannot be determined	18413	Erik	TD, BB, Beams 16-17	A toe puff and 11 fragments of the soles and uppers	Extremely fragmentary
Cannot be determined	18425	Erik	TD, BB, Beams 16-17	Part of a birch bark sole and a leather sole edge	The wooden peg holes are visible along the edges and at the center of the heel.
Cannot be determined	16497	Erik	HS, BB, Beams 18-19	10 fragments of a shoe, including soles	The soles have visible wooden peg holes.
Cannot be determined	16838	Erik	HS, BB, Beams 15-16	4 fragments of a shoe bottom, including a portion of the sole	The leather fragments have stitching and wooden peg holes.
Cannot be determined	08505	Filip	ÖB, SB, Beams 23-24	3 fragments of a heel and a left portion of a sole	Heel probably consisted of six flaps. The shoe pegs are still in place.
Possibly a Boot	10139	Found next to Filip	ÖB, SB, Beams 22-24	35 shoe fragments, including three soles, a quarter, heel flaps, and toe insertions	One fragment has wooden pegs still in place

Shoe Type	***Find No.***	***Association***	***Exact Location***	***Components Represented***	***Noteworthy Features***
Cannot be determined	10141	Filip	ÖB, SB, Beams 22-24	Thirty shoe fragments, including a shoe bottom with five heel flaps and toe insertions	Wooden peg holes and stitching holes are visible on most fragments.
Half-slipper	10142	Found next to Filip	ÖB, SB, Beams 22-24	Parts of a whole shoe, including an upper with two eyelets, a shoe bottom with three soles connected with wooden pegs, and 15 additional shoe fragments	Stitching is visible on the upper.
Cannot be determined	11689	Ludwig	HS, MS, Beams 12-13	Nineteen shoe fragments, including soles, heel flaps, uppers, and the front of a shoe bottom.	A majority of the fragments have intact shoe pegs and threading.
Tie Shoe	23069	Located on Ylva's Foot Bones	Outside the Ship	A shoe bottom with a fragmentary upper, three felt-like pieces, 15 fragments of the leather bottom, and six small wooden fragments.	The heel was composed of five heel flaps, which were placed between the outer and inner soles. Insole leather is 0.6 cm thick and very strong.

Shoe Type	***Find No.***	***Association***	***Exact Location***	***Components Represented***	***Noteworthy Features***
Tie Shoe	23070	Located on Ylva's Foot Bones	Outside the Ship	A shoe bottom with a fragmentary upper	The bottom is composed of three soles and 5 heel flaps. The sides of the shoes are attached to each other along the center back.

APPENDIX B: COINAGE

Copper coins found in association with the human remains aboard *Vasa*

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre	03172	Adam	ÖB, SB, Beams 5-6	Arboga (Unreadable)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letters ÖR
½ öre klipping	03184	Adam	ÖB, SB, Beams 5-6	Säter (Unreadable)	Vasa Dynasty Sheaf; the letter G is to the left, the letter A is above, and the letter R is to the right	Two crossed arrows beneath a crown; the number ½ is to the left, and the letters ÖR are to the right
1 öre	03217	Adam	ÖB, SB, Beams 5-6	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	03218	Adam	ÖB, SB, Beams 5-6	Arboga (1628)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letters ÖR

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre klipping	03219	Adam	ÖB, SB, Beams 5-6	Säter (Unreadable)	Three crowns forming an upside down triangle—the Swedish Emblem; the letter G is to the left, the letter A is above, and the letter R is to the right	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	42822	Adam	ÖB, SB, Beams 5-6	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	42823	Adam	ÖB, SB, Beams 5-6	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	42834	Adam	ÖB, SB, Beams 5-6	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre	42825	Adam	ÖB, SB, Beams 5-6	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	43206	Adam	ÖB, SB, Beams 5-6	Arboga (1627)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letter ÖR
1 öre	43207	Adam	ÖB, SB, Beams 5-6	Arboga (1627)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letter ÖR
1 öre	43208	Adam	ÖB, SB, Beams 5-6	Arboga (1627)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letter ÖR
1 öre	43209	Adam	ÖB, SB, Beams 5-6	Arboga (1628)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letter ÖR

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre	43210	Adam	ÖB, SB, Beams 5-6	Arboga (1628)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letter ÖR
1 öre	09011	Beata	ÖB, BB, Beams 6-8	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07621	David	ÖB, SB, Beams 14-15	Säter (1628)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre	07644	David	ÖB, SB, Beams 14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	07644	David	ÖB, SB, Beams 14	Arboga (Unreadable)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letter ÖR
1 öre	07644	David	ÖB, SB, Beams 14	Arboga (Unreadable)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letter ÖR
1 öre	07644	David	ÖB, SB, Beams 14	Arboga (Unreadable)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letter ÖR
1 öre	07644	David	ÖB, SB, Beams 14	Arboga (Unreadable)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letter ÖR
1 öre	07644	David	ÖB, SB, Beams 14	Arboga (Unreadable)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letter ÖR

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre	07644	David	ÖB, SB, Beams 14	Arboga (Unreadable)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letter ÖR
1 öre	07644	David	ÖB, SB, Beams 14	Arboga (Unreadable)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letter ÖR
1 öre	07644	David	ÖB, SB, Beams 14	Arboga (Unreadable)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letter ÖR
1 öre	07644	David	ÖB, SB, Beams 14	Arboga (Unreadable)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letter ÖR
1 öre	07644	David	ÖB, SB, Beams 14	Nyköping (Unreadable)	Swedish National Coat of Arms	The side view of a Griffin; the number two is to the left, and the letters ÖR are to the right
1 öre klipping	07644	David	ÖB, SB, Beams 14	UNKNOWN	UNKNOWN	UNKNOWN

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre	42376	David	ÖB, SB, Beams 14	Säter (1627)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	42377	David	ÖB, SB, Beams 14	Säter (1627)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	42378	David	ÖB, SB, Beams 14	Säter (1627)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	42379	David	ÖB, SB, Beams 14	Säter (1627)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	42380	David	ÖB, SB, Beams 14	Säter (Unreadable)	Three crowns forming an upside down triangle—the Swedish Emblem; the letter G is to the left, the letter A is above, and the letter R is to the right	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
2 öre klipping	42381	David	ÖB, SB, Beams 14	Nyköping (Unreadable)	Letters GAR in horizontal row	Vasa Dynasty Sheaf; the number two is to the left, and the letters ÖR are to the right
1 öre	43093	David	ÖB, SB, Beams 14	Arboga (1628)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letter ÖR
1 öre	43094	David	ÖB, SB, Beams 14	Arboga (1628)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letter ÖR
1 öre	43754	David	ÖB, SB, Beams 14	Stockholm (1611)	Three crowns forming an upside down triangle—the Swedish Emblem—with the letters C and R on the left and right side joints	Three crowns forming an upside down triangle—the Swedish Emblem with a lion standing on its hind feet in the middle above 1 ÖR
½ öre	43755	David	ÖB, SB, Beams 14	Stockholm (1565)	Uppercase E below a crown with the number 6 and 5 on the either side	A shield with the Vasa sheaf in the center

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre	42807	Erik	UB, SB, Beams 18-19	Säter (1628)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	42808	Erik	UB, SB, Beams 18-19	Säter (1628)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	42809	Erik	UB, SB, Beams 18-19	Säter (1628)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	42810	Erik	UB, SB, Beams 18-19	Säter (1627)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	42811	Erik	UB, SB, Beams 18-19	Säter (1627)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	42812	Erik	UB, SB, Beams 18-19	Säter (1627)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre	11529	Erik	UB, SB, 18-19	Nyköping (Unreadable)	Swedish National Coat of Arms	The side view of a Griffin; the number two is to the left, and the letters ÖR are to the right
1 öre	16839	Erik	HS, BB, Beams 15-16	Säter (1628)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	41161	Erik	ÖB, SB, Beams 18-19	Arboga (1628)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letter ÖR
½ öre klipping	41162	Erik	ÖB, SB, Beams 18-19	Säter (Unreadable)	Vasa Dynasty Sheaf; the letter G is to the left, the letter A is above, and the letter R is to the right	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
½ öre klipping	41163	Erik	ÖB, SB, Beams 18-19	Säter (Unreadable)	Vasa Dynasty Sheaf; the letter G is to the left, the letter A is above, and the letter R is to the right	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
½ öre klipping	41164	Erik	ÖB, SB, Beams 18-19	Säter (Unreadable)	Vasa Dynasty Sheaf; the letter G is to the left, the letter A is above, and the letter R is to the right	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre klipping	41165	Erik	ÖB, SB, Beams 18-19	Säter (Unreadable)	Three crowns forming an upside down triangle—the Swedish Emblem; the letter G is to the left, the letter A is above, and the letter R is to the right	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre klipping	41166	Erik	ÖB, SB, Beams 18-19	Säter (Unreadable)	Three crowns forming an upside down triangle—the Swedish Emblem; the letter G is to the left, the letter A is above, and the letter R is to the right	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	42806	Erik	UB, SB, Beams 18-19	Arboga (1628)	Swedish National Coat of Arms	A front view of an eagle with widespread wings; beneath this is the number 1 and letter ÖR

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre	42813	Erik	UB, SB, Beams 18-19	Säter (1627)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	42906	Erik	HS, BB, Beams 15-16	Säter (1627)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre klipping	08502	Filip	ÖB, SB, Beams 23-24	Säter (Unreadable)	Three crowns forming an upside down triangle—the Swedish Emblem; the letter G is to the left, the letter A is above, and the letter R is to the right	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre klipping	40746	Filip	ÖB, SB, Beams 22-23	Säter (Unreadable)	Three crowns forming an upside down triangle—the Swedish Emblem; the letter G is to the left, the letter A is above, and the letter R is to the right	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre klipping	40747	Filip	ÖB, SB, Beams 22-23	Säter (Unreadable)	Three crowns forming an upside down triangle—the Swedish Emblem; the letter G is to the left, the letter A above, and the letter R to the right	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	40748	Filip	ÖB, SB, Beams 22-23	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre klipping	40683	Filip	ÖB, SB, Beams 22	Säter (Unreadable)	Three crowns forming an upside down triangle—the Swedish Emblem; the letter G is to the left, the letter A is above, and the letter R is to the right	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre klipping	40684	Filip	ÖB, SB, Beams 22	Säter (1625)	Three crowns forming an upside down triangle—the Swedish Emblem; the letter G is to the left, the letter A is above, and the letter R is to the right	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre klipping	40685	Filip	ÖB, SB, Beams 22	Säter (1626)	Three crowns forming an upside down triangle—the Swedish Emblem; the letter G is to the left, the letter A is above, and the letter R is to the right	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre klipping	40686	Filip	ÖB, SB, Beams 22	Säter (Unreadable)	Three crowns forming an upside down triangle—the Swedish Emblem; the letter G is to the left, the letter A is above, and the letter R is to the right	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
2 öre klipping	40687	Filip	ÖB, SB, Beams 22	Nyköping (Unreadable)	The Letters GAR in a straight line	Three crowns forming an upside down triangle—the Swedish Emblem; the number two is to the left, and the letters ÖR are to the right
1 öre klipping	43069	Filip	ÖB, SB, Beams 22	Säter (1626)	Three crowns forming an upside down triangle—the Swedish Emblem; the letter G is to the left, the letter A is above, and the letter R is to the right	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	14272	Helge	UB, BB, Beams 13-14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	14272	Helge	UB, BB, Beams 13-14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	14272	Helge	UB, BB, Beams 13-14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre	14272	Helge	UB, BB, Beams 13-14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	14272	Helge	UB, BB, Beams 13-14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	14272	Helge	UB, BB, Beams 13-14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	14272	Helge	UB, BB, Beams 13-14	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	14272	Helge	UB, BB, Beams 13-14	Nyköping (Unreadable)	Swedish National Coat of Arms	The side view of a Griffin; the number two is to the left
1 öre	14272	Helge	UB, BB, Beams 13-14	Nyköping (Unreadable)	Swedish National Coat of Arms	The side view of a Griffin; the number two is to the left
1 öre klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
½ öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN

Coin Type	*Find No.*	*Association*	*Exact Location*	*Location (Year Struck)*	*Obverse Decoration*	*Reverse Decoration*
½ öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
½ öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
½ öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
½ öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
½ öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
½ öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
½ öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
½ öre Klipping	14272	Helge	UB, BB, Beams 13-14	UNKNOWN	UNKNOWN	UNKNOWN
1 öre klipping	20088	Johan	HS, Beams 5-6	Säter (Unreadable)	Three crowns forming an upside down triangle—the Swedish Emblem; the letter G is to the left, the letter A is above, and the letter R is to the right	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre klipping	40688	Johan	HS, Beams 5-6	Säter (Unreadable)	Three crowns forming an upside down triangle—the Swedish Emblem; the letter G is to the left, the letter A is above, and the letter R is to the right	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre	11691	Ludwig	HS, MS, Beams 12-13	Säter (1627)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right
1 öre klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
1 öre Klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
2 öre klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
2 öre klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
2 öre klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN
2 öre klipping	23068	Ylva	Outside of *Vasa*	UNKNOWN	UNKNOWN	UNKNOWN

Coin Type	***Find No.***	***Association***	***Exact Location***	***Location (Year Struck)***	***Obverse Decoration***	***Reverse Decoration***
2 öre	23068	Ylva	Outside of *Vasa*	Säter (Unreadable)	Swedish National Coat of Arms	Two crossed arrows beneath a crown; the number 1 is to the left, and the letters ÖR are to the right

APPENDIX C: PERMISSION LETTERS

Jessica Smeeks
15 North Street, Apt. 1
Binghamton, NY 13905

April 18, 2014

Fred Hocker
Research Director, Ship Unit
Statens Maritima Museer / Swedish National Maritime Museums
Marinmuseum – Sjöhistoriska museet – Vasamuseet
P.O. Box 27131
SE-102 52 Stockholm

Dear Fred Hocker:

This letter will confirm our recent email conversations. I am completing a masters thesis at East Carolina University entitled "Characterizing the Deceased Mariners of the Swedish Warship *Vasa*: An Analysis of Personal Possessions Found in Association with Human Remains." I would like your permission to reprint in my thesis all images of *Vasa* personal belongings and other relevant images from the museum's database Marketstore.

The requested permission extends to any future revisions and editions of my thesis, including non-exclusive world rights in all languages. These rights will in no way restrict republication of the material in any other form by you or by others authorized by you. Your signing of this letter will also confirm that your company owns the copyright to the above-described material.

If these arrangements meet with your approval, please sign this letter where indicated below and return it via email to jsmeeks@gmail.com. Thank you very much.

Sincerely,

Jessica Smeeks

PERMISSION GRANTED FOR THE USE REQUESTED ABOVE:

Fred Hocker 23 April 2014

APPENDIX C: PERMISSION LETTER

Jessica Smeeks
15 North Street, Apt. 1
Binghamton, NY 13905

April 18, 2014

Faye Cliné
Mauritshuis
Plein 29, 2511 CS Den Haag, The Netherlands
PO Box 536, 2501 CM Den Haag, The Netherlands

Dear Faye Cliné,

This letter will confirm our earlier email conversations. I am completing a masters thesis at East Carolina University entitled "Characterizing the Deceased Mariners of the Swedish Warship *Vasa*: An Analysis of Personal Possessions Found in Association with Human Remains." I would like your permission to reprint in my thesis excerpts the images that follow:

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Ice Scene
c. 1610
inventory # 785

Thomas de Keyser
Portrait of Loef Vredericx as an Ensign
1626
inventory #806

Adriaen Brouwer
Inn with Drunken Peasants
c.1625-1626
inventory #847

David Teniers the Younger
The Alchemist
c. 1640-1650
inventory #261

Jan Miense Molenaer
The Five Senses: Touch
The Five Senses: Sight
The Five Senses: Sound
The Five Senses: Smell
The Five Senses: Taste
1637
Inventory #s 572-576

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If these arrangements meet with your approval, please sign this letter where indicated below and return it to me in the enclosed return envelope. Thank you very much.

Sincerely,

Jessica Smeeks

PERMISSION GRANTED FOR THE USE REQUESTED ABOVE:

Faye Ciné

[Addressee's Name]

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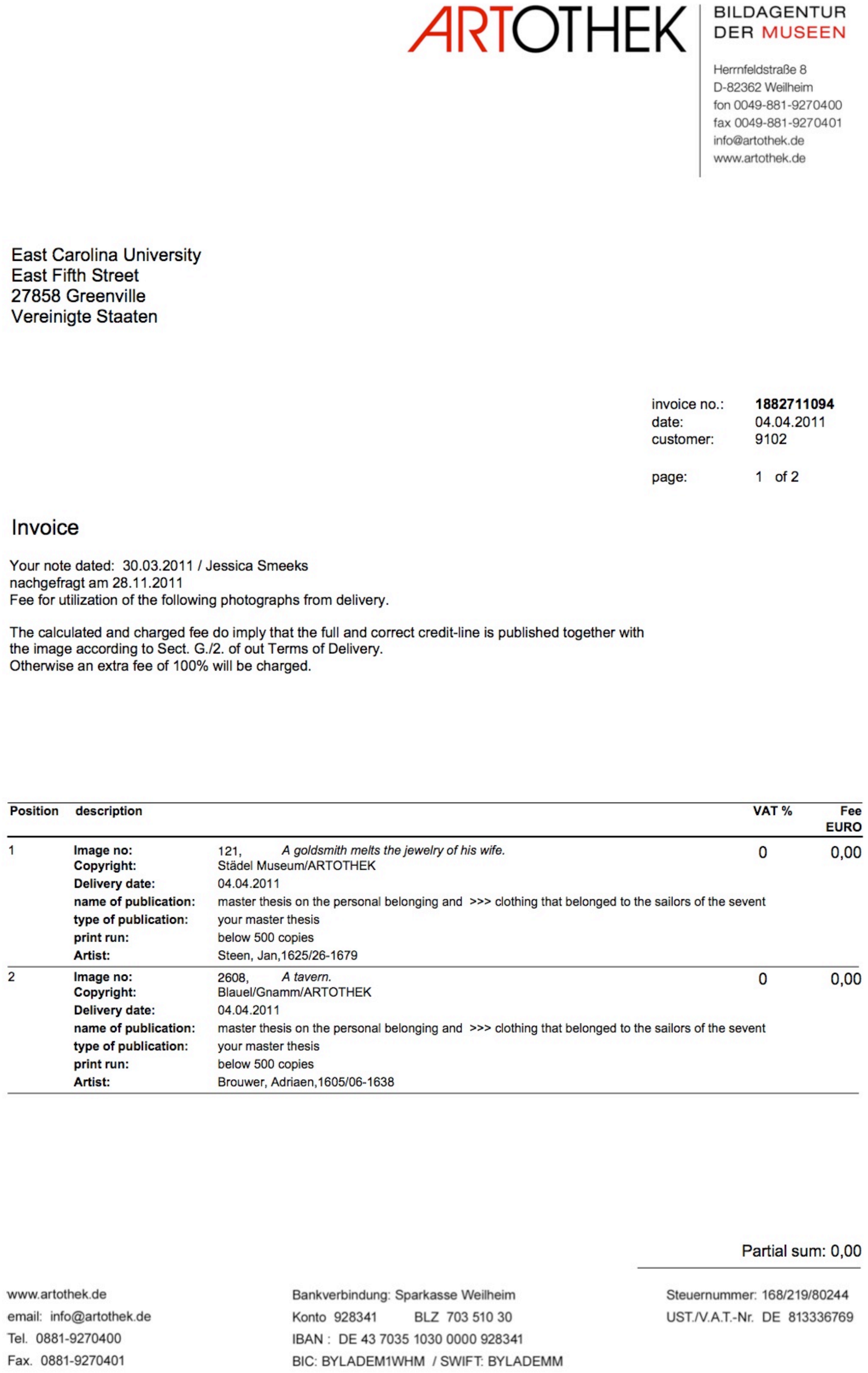

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Jessica Smeeks
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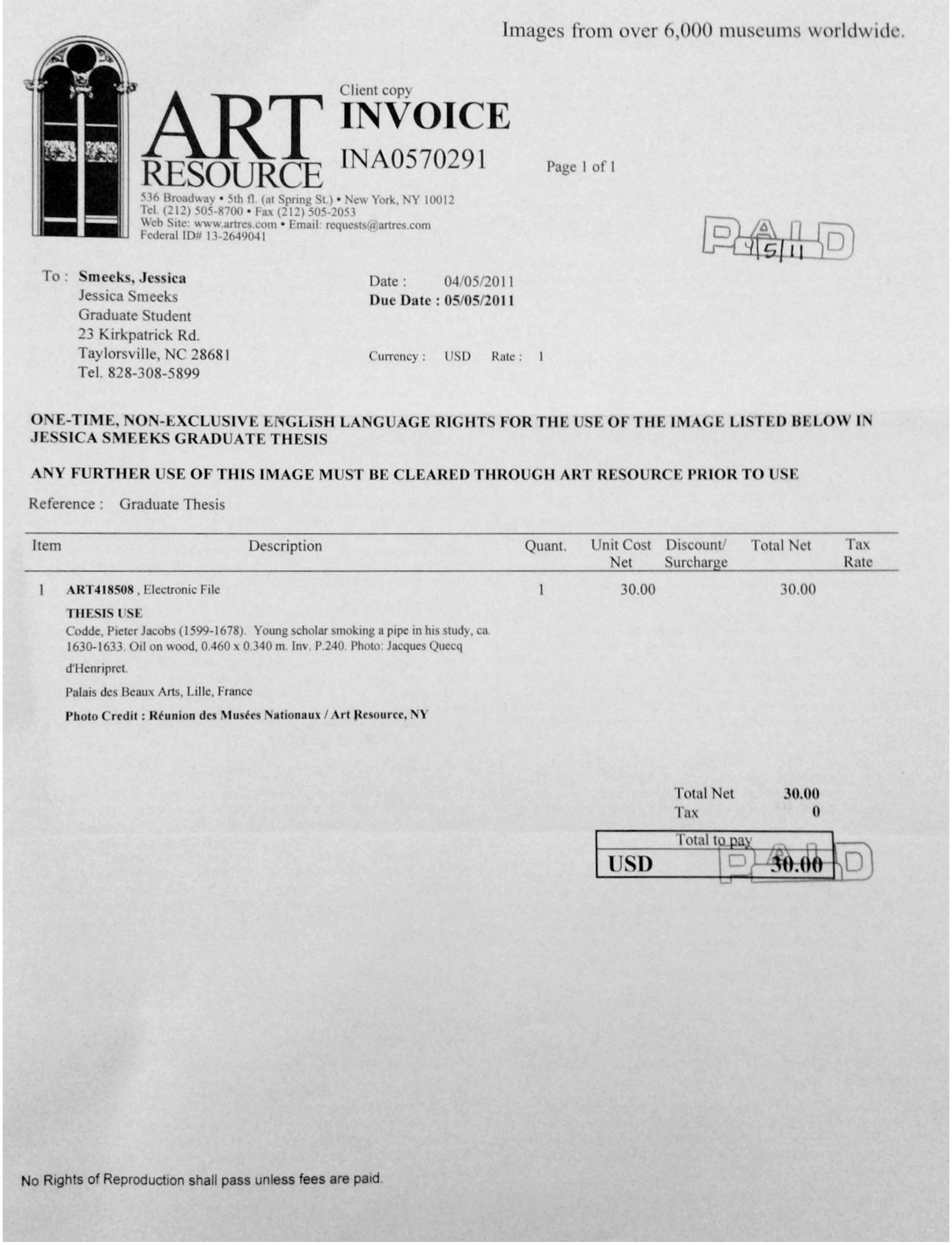

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Graduate Student
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Taylorsville, NC 28681
Tel. 828-308-5899

Date : 04/05/2011
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